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GLOBALIZATION IN THE FOOD SECTOR AND POVERTY

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Globalization in the Food sector and Poverty

Abstract: This paper provides new evidence on the globalization–poverty nexus. We innovate by using an indicator of globalization in the food sector, finding evidence of a significantly aggravating impact on poverty prevalence, adding to earlier studies that use indicators of general globalization. The opening of food markets since the mid-1990s in Latin America might have accounted for approximately 2 additional percentage points of the population living below the absolute poverty line of $2 a day in our sample.

Keywords*: Economic Impacts of Globalization, Agriculture in International Trade, Food Policy*
JEL*: F66, Q17, Q18*

1 Introduction

The effects of globalization on poverty are a much debated topic in economics, with no consensus on the sign and magnitude of the effects. A summary of the empirical results of the last three decades is given by Winters et al. (2004) and Winters and Martuscelli (2014). Most commonly proxied with trade openness, globalization is unlikely to reduce poverty on a large scale unless it stimulates economic growth, which itself is poverty reducing (Ravallion and Datt 2002; Dollar and Kraay 2002). Most papers that link trade openness directly to poverty prevalence find no significant effects (Dollar and Kraay 2002, 2004; Ravallion 2006).

The effects of globalization have also been analyzed in other dimensions, and some studies have explicitly tested globalization in the food sector. It has been reported to aggravate inequality (Artuc et al. 2021), hunger (Mary 2019), employment (Porto 2008), and food security (Chikhuri 2013). On the other hand, food prices rise with inflation, often

followed by decreasing unemployment rates (Berentsen et al. 2011; Ball et al. 2013); market opening can stimulate agricultural exports, which can promote growth and therefore reduce poverty (Porto 2008; Sanjuán-López and Dawson 2010).

We add to the discussion by implementing a first cross-country model to estimate the effect of globalization in the food sector instead of general globalization on absolute poverty. Using food trade openness rather than general globalization measures is reasonable since the majority of people experiencing poverty live in rural areas and depend on agriculture, which is dominated by small-scale family farmers (Gollin et al. 2005). For people who live in poverty but do not directly depend on agriculture for their livelihoods, staple foods make up a large proportion of their daily expenses, and fluctuations in food prices can put them in financial distress (Winters and Martuscelli 2014). Mary (2019) collects a new proxy for globalization in the food sector that we use as an explanatory variable in a poverty equation on the basis of the model of Polloni-Silva et al. (2021).

Researchers early on have acknowledged that estimating cross-country poverty models is prone to errors, as the assumption that poverty in Angola and Austria, for example, is comparable, does not hold (Winters et al. 2004). Artuc et al. (2021) attempt to unify the evidence at the household level by pooling household-level data from different countries, but their database is limited to one year, as the surveys were conducted using different methods and the indicators are not uniform. Data quality and availability do not yet allow the extension of cross-country data at the household level over several years.

Following Neaime and Gaysset (2018) and Polloni-Silva et al. (2021), we take a middle path and use aggregated poverty data for countries within a continent that share similar socioeconomic and geographical conditions. In this way, we maintain comparability between countries while providing answers at a larger scale.

Using our newly constructed database and poverty equation, our results suggest that globalization in the food sector, in contrast to overall globalization, has a significantly aggravated impact on poverty prevalence. The orientation of the food sector in Latin

America toward international markets described by Weisskoff (1992) and Carter et al. (1996), not yet analyzed by its impacts, may account for approximately 2 percentage points of the population living below the absolute poverty line of $2 a day in our sample.

Section 2 presents our data, and Section 3 introduces the empirical model and presents the results. Section 4 presents the robustness analysis, and Section 5 concludes.

2 Data

We construct a dataset with 12 Latin American countries covering approximately 84% of Latin America's total population, resulting in a balanced panel dataset with observations from 1995 to 2020 similar to that of Polloni-Silva et al. (2021) but covering a much larger time span of 26 years [1].

In line with the previous literature, we define absolute poverty as the percentage of people living below the absolute poverty line (poverty), which is currently set at USD 2.15 a day at the 2017 Purchasing Power Parity (PPP) (World Bank, 2022). As mentioned in the introduction, the economic literature commonly proxies globalization by a country's openness to international trade, defined as the share of imports and exports relative to GDP (Trade). Both indicators are taken from the World Bank's World Development indicators database (World Bank 2005).

To assess the extent of globalization in the food sector, we follow Mary (2019). We begin by collecting data from the United Nations Food and Agriculture Organization statistics database on total agricultural exports and imports, as well as food exports and imports, which include both crop and livestock products (FAOSTAT 1998). Second, we calculate the ratios of agricultural exports (imports) to the total volume of exports (imports). These ratios are then multiplied by the total value of exports (imports) in constant local

[1] A list of countries can be found in Table A1 in the Appendix. The only Latin American country with a population of more than 30 million missing from the dataset is Venezuela, for which reliable data are not available.

currency units, resulting in agricultural imports and exports. We then calculate agricultural GDP by multiplying the percentage of agriculture to total value added, obtained from the WDI database, by total GDP in constant local currency units. This allows us to construct a measure of (non)agricultural trade openness by dividing the sum of agricultural exports and imports by (non)agricultural GDP. Finally, we further decompose agricultural trade openness into trade openness in the food sector and trade openness in the remaining sectors. FAOSTAT and WDI data can then be used to calculate the share of food exports (imports) in the agricultural sector and the share of food GDP in agricultural GDP. Thus, we constructed trade openness in the food sector (*Trade Food*) and trade openness in the remaining sectors (*Trade other*) that target nonfood nonagricultural goods as subcomponents of overall trade openness.

While the specific impact of openness in the food sector on absolute poverty has not been the subject of research, there is rich literature on the determinants of (absolute) poverty, and we draw our control variables from it. Using data from the World Bank, we include (real) per capita GDP in USD (*gdppc*) as the measure of economic performance. To cover effects from the labor market, we include national unemployment rates as a percentage of the total labor force (*Unemployment*) and the female labor force participation rate as a percentage of the overall female population aged older than fifteen years (*Female workforce)*. Moreover, we add consumer prices (*CPI,* 2010=100) to account for poverty, which is driven by inflation. Finally, we include the word governance indicator rule of law (*rule of law*) and the WDI's percentage of the urban population (*urbanization*) of the total population to account for general political stability and rural exodus.

Table 1 presents the summary statistics and suggests that (Total Exports + total Imports)/GDP amounts to 66% on average. In the food sector, openness to trade is much greater, with the volume of trade in food being 141% of the volume of food produced domestically. This number reflects the agricultural and food export boom in Latin American countries from the 1990s onward (Weisskoff 1992; Carter et al. 1996), standing in

stark contrast to the food sectors of other developing countries, which are highly protected (Anderson 2016).

Table 1: Variable descriptions and summary statistics

VARIABLES	Definition	N	mean	sd	min	max
Poverty hr $2.15	Poverty headcount ratio at $2.15 a day (2017 PPP) (%)	273	8.092	6.309	0.400	28.60
Poverty gap $2.15	Poverty gap at $2.15 a day (2017 PPP) (%)	273	3.320	3.098	0.200	15.10
Poverty hr $3.65	Poverty headcount ratio at $3.65 a day (2017 PPP) (%)	273	17.32	10.35	2.100	48.90
Poverty gap $3.65	Poverty gap at $2.15 a day (2017 PPP) (%)	273	7.130	5.164	0.700	23.50
MPI	Multidimensional poverty headcount ratio (World Bank) (% of population)	105	6.467	4.959	0.600	21.90
Trade	Log (imports + Exports)/GDP	312	0.669	0.349	0.146	1.728
Trade Food	Log (Food imports + Food Exports)/Food GDP	312	1.411	0.880	0.306	4.318
Trade other	Log (Non-Food, non-agricultural imports + Non-Food, non-agricultural Exports)/ Non-Food, non-agricultural GDP	312	0.640	0.361	0.130	1.735
GDPPC	Initial GDP per capita in 100 US$ (constant 2015)	312	63.48	33.85	16.94	151.2
CPI	Consumer price index (2010 = 100)	307	88.31	33.94	20.59	172.8
Unemployment	Unemployment, total (% of total labour force)	291	7.118	3.702	2.021	20.52
Fem. workforce	Labor force participation rate, female (% of female population ages 15+)	312	49.71	7.785	33.86	72.07
Urbanization	Urban population (% of total population)	312	70.24	11.50	42.94	92.11
Food exporter	dummy=1 if country is a net food exporter	312	0.670	0.471	0	1

3 Empirical strategy and results

The determinants of poverty have been modeled in different frameworks (Ravallion 2006; Nikoloski 2011; Kwon and Kim 2014; Awaworyi Churchill and Smyth 2017; Omar

and Inaba 2020; Polloni-Silva et al. 2021)[2]. As a starting point, we draw on Polloni-Silva et al. (2021) as one of the most recent empirical models that takes into account the current state of the literature; they also model absolute poverty for a sample of Latin American countries similar to ours:

$$Poverty_{it} = \alpha_0 + \beta_1 GDPPC_i + \beta_2 Inflation_{it} + \beta_3 Unemployment_{it} + \beta_4 Female\ Workforce_{it} + \beta_5 Urbanization_{it} + \beta_6 Rule\ of\ law_{it} + c_i + \varepsilon_{it}, \quad (1)$$

where *Poverty* is the percentage of people living below the poverty line defined by the World Bank, *GDPPC* is (real) per capita GDP, *Inflation* is Consumer Prices, *Trade* is the share of imports and exports relative to GDP, *Unemployment* is the national unemployment rate*, Female workforce* is the female participation rate in national labor markets, *Urbanization* is the urbanization rate, *Rule of law* is the rule of law index and c_i is a full set of country fixed effects.

Table 2 Column 1.1 presents the results of estimating Equation (1) for the same years as in on Polloni-Silva et al.Polloni-Silva et al. (2021) (2004-2017) and shows that we were able to replicate their results in general. The per capita GDP has a significant negative effect on poverty prevalence; a one percent increase in initial levels of the GDPPC is followed by a decrease of 0.18 percent of people living below the absolute poverty line of $2.15 per day. Our results show weaker (negative) effects than those of Polloni-Silva et al. (2021) but are in line with most of the relevant literature (Nikoloski 2011; Kwon and Kim 2014; Awaworyi Churchill and Smyth 2017). Consumer prices also have a significant negative effect on poverty, in line with Polloni-Silva et al. (2021), but at odds with theory and other empirical evidence (Winters et al. 2004; Winters and Martuscelli 2014; Omar and Inaba 2020). Unemployment significantly aggravates poverty, and a one percent increase in the national unemployment rate is associated with a 0.7 percent increase in

[2] A comprehensive summary of studies analyzing the determinants of poverty is given in Table A2 in the Appendix.

the number of people living in absolute poverty, which is in line with estimates of Polloni-Silva et al. (2021). A one percent increase in female labor force participation causes a 0.17 percent decrease in national poverty levels, whereas Polloni-Silva et al.Polloni-Silva et al. (2021) find no correlations. Consistent with Polloni-Silva et al.Polloni-Silva et al. (2021), urbanization has a significant negative impact on poverty in our sample, with a one percent increase in the national urbanization rate being associated with a 0.2 percent decrease in the number of people living in extreme poverty. Finally, there is no significant effect of the rule of law, which is also in line with the baseline paper.

When the database is expanded to full coverage (1995-2020) and includes a linear time trend (Column 1.2) or yearly fixed effects (Column 1.3) to account for the (negative) trend in absolute poverty levels in Latin America in our sample (Fig. B1, left-hand panel, Annex), the significant negative effect from urbanization and female labor force participation disappears, whereas the negative effect of consumer prices becomes significantly positive, with magnitude and sign in line with the literature (Winters et al. 2004; Omar and Inaba 2020).

Table 2: Determinants of (absolute) poverty: Replication of Polloni-Silva et al. (2021)

Variables	PHC $2.15		
	(1.1)	(1.2)	(1.3)
GDPPC	-0.184***	-0.205***	-0.172***
	(0.0570)	(0.0302)	(0.0310)
CPI	-0.0699***	0.0314*	0.0541***
	(0.0126)	(0.0175)	(0.0176)
Unemployment	0.688***	0.384***	0.112
	(0.101)	(0.0826)	(0.118)
Fem. workforce	-0.175*	-0.0896	-0.0265
	(0.0930)	(0.0556)	(0.0550)
Urbanization	-0.203*	0.0629	0.133
	(0.115)	(0.0825)	(0.0816)
Rule of law	-0.880	0.487	-0.189
	(1.174)	(1.575)	(1.646)
Linear trend		-0.712***	
		(0.0969)	
Year FEs	NO	NO	YES
Country FEs	YES	YES	YES
Observations	155	227	227
R-squared	0.881	0.884	0.900

Notes: * p < 0.1,** p < 0.05,*** p < 0.01, Cluster-robust Std. errors are in parentheses. The dependent variable is poverty headcount ratio at $2.08 a day (2017 PPP) in %.

In a second step, we add the trade openness proxy (*Trade*) explained in Section 2 to Model (1) to isolate the effect of globalization on poverty prevalence. We follow Mary (2019) and take logs of *Trade* to monitor short-term spikes in imports or exports of individual products. In addition, year fixed effects are included to control for structural breaks due to exogenous shocks and trend behavior in poverty prevalence, and cluster-robust standard errors are used to control for heteroskedasticity. We use country fixed effects to capture sociocultural determinants of poverty that may be correlated with trade, such as ethnic diversity and colonial history (Cagatay 1998; Dollar and Kraay 2002), which are known to be fairly constant over limited time horizons (Dollar and Kraay 2004). This also applies to the rule of law index (Dollar and Kraay 2004Dollar and Kraay

2004), which we have excluded in the following to avoid loss of information, as its coverage does not extend to the mid-1990s.[3]

As endogeneity concerns may arise when analyzing determinants of poverty, we follow Ravallion (2006) and Anser et al. (2020), who assume that income is affected by poverty or shocks to it and therefore rely on initial levels of the observation period. We follow (Dollar and Kraay 2002) and assume that consumer prices are unaffected by the level of absolute poverty and that the level of urbanization is independent of the prevalence of poverty.[4]

Finally, we follow Nikoloski (2011), Kwon and Kim (2014), Awaworyi Churchill and Smyth (2017), and Polloni-Silva et al. (2021) by relying on absolute poverty levels rather than changes.[5] To protect our results from potential spurious correlations, we check all dependent variables on unit roots via a panel unit root test according to Breitung and Das (2005) but find no evidence of random behavior in our poverty measures. Our model for estimating the effect of overall trade openness on poverty prevalence writes

$$Poverty_{it} = \alpha_0 + \beta_1 Trade_{it} + \beta_2 GDPPC_i + \beta_3 inflation_{it} + \beta_4 Unemployment_{it} + \beta_5 Female\ Workforce_{it} + \beta_6 Urbanization_{it} + c_i + \varphi_t + \varepsilon_{it} \quad (2)$$

Most of the variables are equivalent to the model in (1), with the exception of GDPPC, which now represents the initial level of GDP per capita. *Trade* is the log of imports+exports/GDP, and φ_t is a full set of year fixed effects.

Table 3 reports the results of estimating equation (2) (Columns 2.1-2.3) and the same model with trade openness split into food and nonfood sectors (Columns 2.4-2.6). We

[3] We have also estimated the baseline specifications including the rule of law index, but the results remain unchained. They are available from the authors on request.

[4] We control for the "rural exodus" effect (Shaw 1974), caused by poor rural populations migrating to urban areas in the hope of better living conditions. However, by estimating the model with initial values of urbanization, we obtain similar results.

[5] Nikoloski 2011 note that gaps in poverty data and overall data availability issues make it difficult to estimate how variables affect poverty changes across countries.

note that the initial values of GDP per capita may be correlated with both year and country intercepts. To ensure that our estimates are not affected by multicollinearity, we follow Kwon and Kim (2014) and estimate Equation (2) without fixed effects (2.1) but add year fixed effects (2.2) and both year and country fixed effects (2.3). If there is a significant change in the model results, this would indicate interdependence between the fixed effects and the initial values. We repeat this procedure for the models assessing globalization by sector (Columns 2.4-2.6). We find that the model outcomes remain stable in all specifications, suggesting that the initial values of GDP per capita are not orthogonal to the fixed effects.

With respect to the determinants of poverty, we observe effects in line with our replication of (Polloni-Silva et al. 2021) and with the literature. The proportion of the population living below the absolute poverty line responds negatively to per capita GDP. An increase in initial per capita income reduces the share of people living below the absolute poverty line by 0.2 percentage points, which is in line with the literature (Nikoloski 2011; Kwon and Kim 2014; Awaworyi Churchill and Smyth 2017). A separate estimation of the corresponding beta weights revealed that (initial) GDP per capita has by far the strongest impact on poverty prevalence in terms of changes in the standard deviation, in line with Ravallion and Datt (2002), Dollar and Kraay (2002) and Dollar and Kraay (2004); the observed decline in absolute poverty from approximately 2002 to 2019 (pre-COVID-19) is consistent with the strong growth in GDP per capita throughout the period (Figure B1, right-hand Panel, Annex).

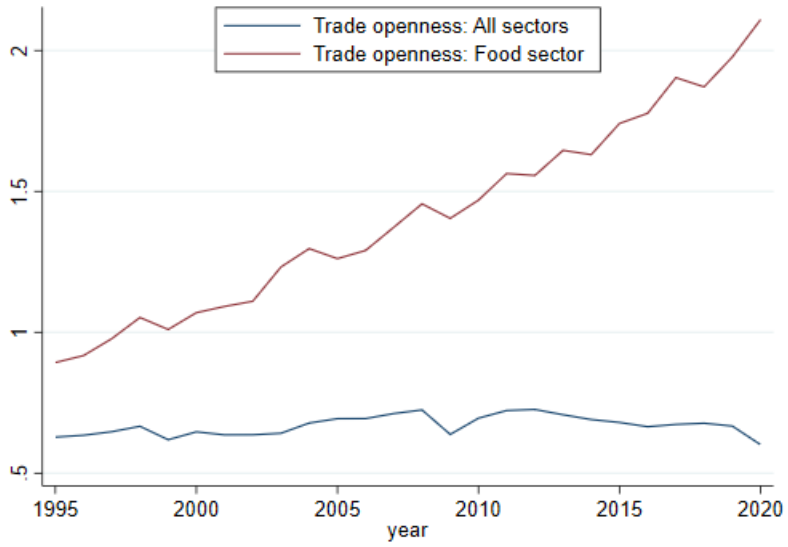
In terms of poverty-enhancing effects, depending on the model chosen, a one percentage point increase in consumer prices is followed by an increase of 0.6-0.8 percentage points in absolute poverty levels, whereas a rise in unemployment by one percentage point leads to an increase of 0.13-0.24 percentage points in the number of people below the absolute poverty line, in line with Cardoso (1992), Janvry and Sadoulet (2000), Hojman (2004) and Omar and Inaba (2020). We find some evidence of a potential positive

effect of urbanization on poverty rates, which is at odds with Polloni-Silva et al. (2021) but in line with Ravallion (2002) and Ravallion et al. (2007)

Most importantly, aggregate levels of globalization in Collumns 2.1-2.3 (*trade*) do not have significant effects on poverty prevalence, which is in line with the previous literature (Ravallion 2006; Kwon and Kim 2014; Anser et al. 2020; Omar and Inaba 2020). To identify the impact of globalization in the food sector on the prevalence of absolute poverty, we follow Mary (2019) and divide overall trade openness into trade openness in the food sector (*Trade Food*) and trade openness in the remaining sectors (*Trade other*).[6] Figure 1 shows that globalization has been more dynamic in the food sector than in the general economy in our sample (see also Weisskoff (1992) and Carter et al. (1996)). For example, the share of food exports and imports in GDP rose from approximately 90 percent in 1995 to more than 200 percent on average in 2020 in the countries in our sample. Thus, pooling all sectors into a single proxy for globalization may hide the dynamics in the food sector, which may be most relevant for poorer persons.

[6] Mary (2019) disaggregates trade openness into food trade openness, nonfood agricultural trade openness and nonagricultural trade openness. We find that food trade openness and nonfood agricultural trade openness are highly collinear, so we exclude any agricultural share from our proxy for trade openness in the remaining sectors

Figure 1: Trade openness: All sectors vs. the food sector



In the third step, we analyze trade openness separately for food sector-specific trade and other sectors. The sectoral models in Table 3, Columns 2.4-2.6 suggest that a one percent increase in our measure of the openness of a country's food sector is associated with an increase of 0.018 percentage points in the number of people living in absolute poverty (log-level relationship). If this effect is scaled up by the observed increase in food globalization in Figure 1 (120%), the absolute effect of globalization in the food sector since the mid-1990s sums to (120*0.018) = 2.16 percentage points. Note that in all specifications, the impact of general trade remains insignificant.

Table 3: Poverty and (food) trade openness

Variables	PHR $2.15					
	(2.1) OLS	(2.2) FE	(2.3) FE	(2.4) OLS	(2.5) FE	(2.6) FE
Ln Trade	-0.794	-0.479	1.576			
	(0.501)	(0.550)	(1.719)			
Ln Trade Food				1.704***	1.810***	1.871***
				(0.482)	(0.501)	(0.710)
Ln Trade other				-0.442	-0.165	1.429
				(0.457)	(0.499)	(1.520)
GDPPC	-0.136***	-0.131***	-0.197***	-0.143***	-0.137***	-0.212***
	(0.0143)	(0.0147)	(0.0267)	(0.0133)	(0.0137)	(0.0282)
CPI	0.0737***	0.0827***	0.0639***	0.0759***	0.0876***	0.0606***
	(0.0215)	(0.0232)	(0.0162)	(0.0199)	(0.0222)	(0.0165)
Unemployment	0.242***	0.158**	0.0662	0.223***	0.126*	0.0841
	(0.0709)	(0.0725)	(0.103)	(0.0739)	(0.0756)	(0.101)
Fem. workforce	-0.0203	-0.0170	-0.0373	0.00310	0.00785	-0.0629
	(0.0334)	(0.0337)	(0.0512)	(0.0318)	(0.0310)	(0.0504)
Urbanization	-0.0669	-0.0513	0.222***	-0.0134	0.00384	0.195**
	(0.0419)	(0.0434)	(0.0795)	(0.0379)	(0.0400)	(0.0784)
Year FEs	NO	NO	YES	NO	NO	YES
Country FES	NO	YES	YES	NO	YES	YES
Observations	260	260	260	260	260	260
R-squared	0.710	0.733	0.905	0.725	0.751	0.909

Notes: * p < 0.1,** p < 0.05,*** p < 0.01, Cluster-robust Std. errors are in parentheses. The dependent variable is poverty headcount ratio at $2.15 a day (2017 PPP) in %; Models 2.1-2.3 correspond to equation (2) gradually adding fixed effects. Models 3.1-3.3 correspond to equation (2), where trade openness is split into food and non-food sectors. A linear trend variable was estimated in all specifications without FEs, but not reported

4 Robustness

Mary (2019) demonstrated that the openness of the food trade may be affected by the prevalence of hunger. Since hunger is closely linked to poverty, we test for potential reverse causality. Following Nikoloski (2011), we therefore estimate the effects of single- and double-lagged food trade openness (Table 4, Columns 4.1 and 4.2) on poverty prevalence but arrive at similar results indicating no bias due reverse causality. Interestingly, the coefficient of our proxy for food market globalization becomes stronger as the lag increases, suggesting that the negative effects of market liberalization take time to fully

manifest, which is consistent with Polloni-Silva et al. (2021). Ravallion (2006) noted that longer lags may be required to capture the poverty benefits from increased factor productivity due to the trade-induced adoption of new technologies. These effects have also been shown for agricultural markets (the Green Revolution) but are mostly restricted to earlier time periods and Asian economists (Litchfield et al. 2003).

The descriptive data in Table 1 showed that the majority of the countries in our sample are food exporters. The impact of food trade openness on hunger, and thus on the very poor, may depend on whether the country is a food exporter or importer (Mary 2019). We therefore reestimate the baseline equation with a dummy = 1 if the country was a net food exporter in the current year (Column 4.3), which we additionally interact with food trade openness (Column 4.4). The corresponding results do not show evidence that the effect of food trade openness depends on whether the country is a net food exporter. These results are consistent with those of Thirlwall (2013), who argues that the export gains from greater openness to international markets might be overrated, and Gacitia and Bello (1991), who reported that primary exports have not increased the general welfare of Latin Americans.

Table 4: Poverty and Food Trade openness: Robustness

Variables	PHR $2.15				
	(2.6)	(4.1)	(4.2)	(4.3)	(4.4)
Ln Trade Food	1.871***			1.825***	1.910**
	(0.710)			(0.678)	(0.876)
L. Ln Trade Food		2.145***			
		(0.624)			
L2. Ln Trade Food			2.656***		
			(0.632)		
Ln Trade other	1.429	0.468	0.703	1.463	1.485
	(1.520)	(1.686)	(1.619)	(1.511)	(1.542)
Initial GDPPC	-0.212***	-0.214***	-0.209***	-0.200***	-0.198***
	(0.0282)	(0.0272)	(0.0257)	(0.0296)	(0.0306)
CPI	0.0606***	0.0598***	0.0643***	0.0606***	0.0619***
	(0.0165)	(0.0159)	(0.0154)	(0.0167)	(0.0171)
Unemployment	0.0841	0.138	0.138	0.105	0.108
	(0.101)	(0.0942)	(0.0870)	(0.106)	(0.110)
Fem. workforce	-0.0629	-0.0676	-0.0520	-0.0508	-0.0521
	(0.0504)	(0.0498)	(0.0482)	(0.0500)	(0.0512)
Urbanization	0.195**	0.158*	0.166**	0.161*	0.156*
	(0.0784)	(0.0815)	(0.0810)	(0.0855)	(0.0909)
Food exporter				-0.573	-0.572
				(0.762)	(0.765)
*Food exp * FTO*					-0.182
					(1.079)
Year FEs	YES	YES	YES	YES	YES
Country FES	YES	YES	YES	YES	YES
Observations	260	254	248	260	260
R-squared	0.909	0.910	0.915	0.909	0.909

Notes: * p < 0.1,** p < 0.05,*** p < 0.01, Cluster-robust Std. errors are in parentheses. The dependent variable is poverty headcount ratio at $2.15 a day (2017 PPP) in %; Model (4.1) corresponds to the baseline specification in equation (2). Models (4.2) and (4.3) correspond the baseline specification with once and double lagged Food Trade openness. Model (4.4) is the baseline specification including a food exporter dummy that is additionally

Finally, we follow Awaworyi Churchill and Smyth (2017) and regress a full set of alternative poverty indicators in our base Equation (2). First, as the results in Table 4 show evidence of potential delayed poverty effects of globalization, we follow Ravallion (2006) and include first lags of our trade proxy into the robustness specifications in the next steps. We first use the poverty headcount ratio at $3.65 to address people who live in less severe poverty (Columns 5.1 and 5.2 in Table 5). As expected, the agricultural and food market effects estimated for our sample are less strong than those estimated for people

living in less severe poverty, which is consistent with the findings of Artuc et al. (2021). However, the underlying pattern remains unchanged; we obtain evidence of a significant negative effect of globalization in the food sector on poverty, in contrast to the lack of effect of overall globalization.

The poverty headcount ratio has been criticized as a measure of absolute poverty because it does not consider how far people's incomes are below the absolute poverty line (Nikoloski 2011; Awaworyi Churchill and Smyth 2017). To address this shortcoming, the World Bank Research Group developed the poverty gap index, defined as the ratio by which the average income of the poor falls below the absolute poverty line. To determine whether the dept of poverty reacts differently to increased food market globalization, we reestimate our baseline equation with the poverty gap at $2.15 (Columns 5.3 and 5.4) and $3.65 (Columns 5.5 and 5.6) as the dependent variable. We observe some evidence of an aggravating effect of globalization in all other sectors on the poverty gap at $2.15, which is consistent with Winters et al. (2004), who find that overall trade openness may only have an effect on the very poorest.

Finally, we use the multidimensional poverty index (MPI) proposed by Alkire and Santos (2014) as a complete indicator that assesses more dimensions of poverty than just available income, such as access to clean water, electricity and housing, as well as education, health care and good nutrition (Columns 5.7 and 5.8). Despite a much smaller data coverage, and similar to Awaworyi Churchill and Smyth (2017), the MPI responds strongly to all covariates, including general trade. However, and similar to the other poverty indicators used, the results remain stable over both specifications, especially concerning the significant effect of food trade openness.

Table 5: Poverty and Food Trade openness: alternative indicators

Variables	PHR $3.65		PG $2.15		PG $3.65		MPI	
	(5.1)	(5.2)	(5.3)	(5.4)	(5.5)	(5.6)	(5.7)	(5.8)
Ln Trade Food	0.784		2.041***		1.672***		2.482***	
	(0.962)		(0.483)		(0.596)		(0.622)	
L. Ln Trade Food		1.736**		1.985***		1.905***		2.002***
		(0.823)		(0.420)		(0.511)		(0.612)
Ln Trade other	-3.203	-4.230	1.910**	1.182	0.737	-0.105	6.740***	7.045***
	(2.320)	(2.568)	(0.859)	(0.939)	(1.213)	(1.338)	(1.309)	(1.441)
Initial GDPPC	-0.43***	-0.441***	-0.076***	-0.072***	-0.174***	-0.175***	-0.31***	-0.30***
	(0.0386)	(0.0371)	(0.0186)	(0.0180)	(0.0227)	(0.0219)	(0.0403)	(0.0426)
CPI	0.0591**	0.0597***	0.0320***	0.0282***	0.0466***	0.0445***	0.143***	0.129***
	(0.0236)	(0.0221)	(0.0103)	(0.00991)	(0.0130)	(0.0124)	(0.0214)	(0.0225)
Unemployment	0.187	0.306**	0.108*	0.116**	0.103	0.144*	0.412***	0.367***
	(0.157)	(0.143)	(0.0553)	(0.0522)	(0.0807)	(0.0736)	(0.0742)	(0.0740)
Fem. workforce	-0.154**	-0.183**	-0.00868	0.00231	-0.0439	-0.0444	-0.15***	-0.16***
	(0.0731)	(0.0722)	(0.0327)	(0.0327)	(0.0403)	(0.0404)	(0.0501)	(0.0538)
Urbanization	0.296**	0.254**	0.0505	0.0273	0.137**	0.106	0.543***	0.516***
	(0.123)	(0.127)	(0.0442)	(0.0463)	(0.0625)	(0.0647)	(0.127)	(0.132)
Year FEs	YES	YES	YES	YES	YES	YES	YES	YES
Country FES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	260	254	260	254	260	254	100	100
R-squared	0.929	0.933	0.863	0.862	0.913	0.915	0.986	0.985

Notes: * p < 0.1,** p < 0.05,*** p < 0.01, Cluster-robust Std. errors are in parentheses. Models (5.1) and (5.2) correspond to the baseline specification with the poverty headcount ratio at $3.65 a day (2017 PPP) as the dependent variable. Models (5.3) and (5.4) correspond to the baseline specification with the poverty gap at $2.15 a day (2017 PPP) as the dependent variable. Models (5.5) and (5.6) correspond to the baseline specification with the poverty gap at $3.65 a day (2017 PPP) as the dependent variable. Models (5.7) and (5.8) correspond to the baseline specification with the Multidimensional Poverty Index from the World Bank as the dependent variable

5 Discussion and Conclusion

We replicate Polloni-Silva et al. (2021) findings on the determinants of poverty via a restricted and complete dataset of 12 Latin American countries covering the years 1995-2020. In a second step, we add our (overall) globalization proxy to the model and find no significant poverty effects, in line with Ravallion (2006), Kwon and Kim (2014), Anser et al. (2020) and Omar and Inaba (2020).

In contrast, when we use globalization in the food sector instead of overall globalization in a third step, we find evidence of a significant effect that is consistent across the different estimation techniques and poverty measures used. According to our estimates,

the globalization in the food sector since the mid-1990s may account for approximately 2 percentage points of the population living below the absolute poverty line of $2.15 a day in our sample. The results are robust to potential endogeneity issues, time series characteristics and potential weaknesses in the absolute poverty measure used.

With respect to other determinants of poverty prevalence, our models identify GDP per capita as the main driver of poverty prevalence, which is in line with the relevant literature. Our estimates may be viewed in addition to the findings of Porto, 2008; Chikhuri, 2013; Mary, 2019, who find aggravating effects of food and agricultural trade openness on variables such as unemployment, food security and hunger prevalence. Our results also add to the literature concerning the impact of agricultural globalization at the local level, where authors find negative poverty effects for selected Asian countries (Litchfield et al., 2003; Huang et al., 2007). Finally, our findings may add to the literature concerning the general determinants of poverty (Ravallion 2006; Nikoloski 2011; Kwon and Kim 2014; Awaworyi Churchill and Smyth 2017; Anser et al. 2020; Omar and Inaba 2020; Polloni-Silva et al. 2021)

Our findings suggest that despite its small share in overall trade, the food sector may play a crucial role in the globalization-poverty nexus. To put these effects into context, there are different channels through which globalization in the food sector can affect absolute poverty. First, consumers experiencing poverty have more problems substituting basic foods (Winters and Martuscelli 2014). Second, globalization may lead to a stronger effect on national food CPIs in times of shortages (Flachsbarth and Garrido (2014)), and such food price shocks are transmitted to poverty rates (Ivanic et al. (2012)). Third, an agri-food export boom may lead to additional land concentration and employment instability, leading to an increase in rural poverty (Carter et al. (1996).

With respect to political implications, globalization in the food sector may have to be accompanied by appropriate policies, including the necessary support to small-scale domestic producers. For example, Ben Hassen and El Bilali (2022) propose a package of policies for greater food sovereignty in MENA countries in response to the price explosion

of staple foods triggered by the Russian attack on Ukraine, ranging from reducing reliance and dependence on a small number of cereal crops and exporting countries to substituting wheat and maize with traditional and locally adapted crops. Barham et al. (1995) suggest that land market reforms that improve smallholders' ability to pay for land can help protect them from the potential poverty traps of the agri-food export boom triggered by food trade liberalization in Chile in the 1990s.

We note potential limitations of our analysis. For example, upscaled effects such as those in Section 3 are based on a particular time period and a specific region. Moreover, the size of these absolute effects could lead to the impression that globalization in the food sector is a major determinant of poverty in our sample. However, our models suggest that the main driver of poverty in our sample remains economic activity: Upscaling the effect of (initial) income, as was done for our proxy for food globalization, reveals a poverty-reducing effect that is more than three times as strong as the poverty impact of our food trade variable, in line with the literature (Dollar and Kraay 2002, 2004).

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Appendix

Figure B1: Averaged poverty headcount ratio at $2.15 and per capita GDP in our sample

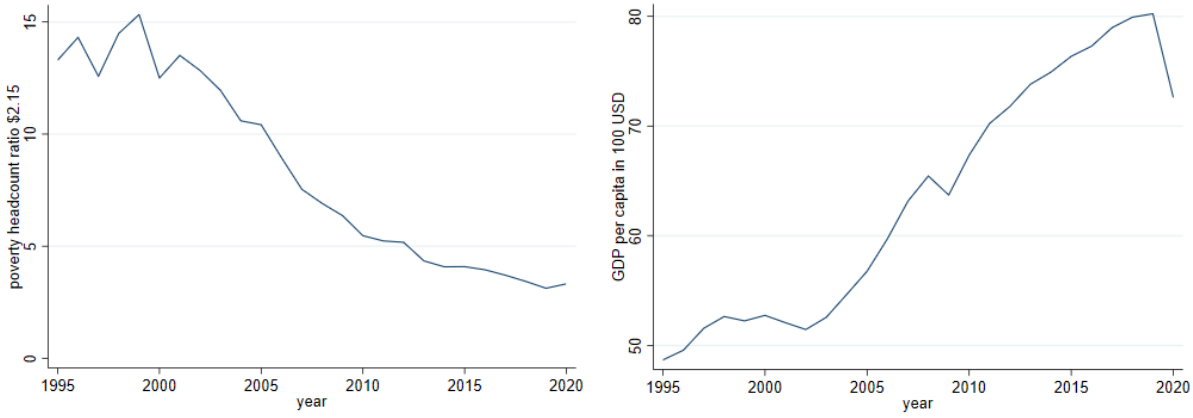

Table A1: List of countries covered in the dataset

country	coverage
Argentina	1996-2017
Bolivia	1997-2020
Brazil	1996-2020
Colombia	1996-2020
Costa Rica	1996-2020
Dominican Republic	1996-2020
El Salvador	1996-2020
Honduras	1996-2020
Mexico	1996-2020
Panama	1997-2020
Paraguay	1996-2020
Peru	1997-2020

Table A2: Summary of previous studies regarding determinants of poverty

Study	Dep. Variable	Main explanator	Income	Trade Openness	GINI	Inflation	Public health	Aid	Education	Institution	Unemployment	Urbanization	Female workforce	Democratization	Government exp.	Credit to private sector	Fixed effects
Ravallion (2006)	Poverty hr	Trade openess	neg	in-sig	in-sig	no	no	no	no		no	no	no	no	no	no	no
Nikoloski (2011)	Poverty hr & gap	Econ. crisis	neg	neg	no	in-sig	in-sig	no	in-sig	no	no	no	no	in-sig	no	no	yes
Kwon & Kim (2014)	Poverty hr	Gouvernance	neg	in-sig	no	no	neg	yes	no	no	no	no	no	no	no	no	yes
Churchill & Smyth (2017)	Poverty hr & gap, MPI	Ethnofrac	neg	no	pos	no	no	no	neg	neg	no	yes	no	no	no	no	yes
Omar and Kazuo (2020)	Poverty hr	Financial inclusion	in-sig	in-sig	pos	neg	no	no	neg	in-sig	no	no	no	no	in-sig	in-sig	yes
Anser et al (2020)	Poverty hr	Crime rates	neg	in-sig	in-sig	no	neg	no	in-sig	no	in-sig	no	no	no	no	no	yes
Polloni-Silva et al. (2021)	Poverty hr	Financial inclusion	neg	no	no	pos	no	no	no	neg	pos	neg	in-sig	no	no	no	yes

Notes: Poverty hr is Poverty headcount ratio at the current absolute poverty level, MPI is Multidimensional Poverty index, Ethnofrac is ethnolinguistic fractionalization, 'no' means not included into the model bei the author, 'insig' means included, but insignificant, 'neg' means significantly negative on conventional signinficance levels, 'pos' means significantly positive on conventional signinficance levels

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