Regional Integration as a Stumbling Block: Gravity Evidence from EU–ACP Trade

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Abstract

This paper investigates whether intra-regional trade integration among African, Caribbean, and Pacific (ACP) countries facilitates or impedes their bilateral trade with the European Union. Using a panel of 78 ACP countries spanning seven Regional Economic Communities (RECs) and all 27 EU member states over 1995–2021, I estimate Poisson pseudo-maximum likelihood (PPML) gravity models with exporter–year, ACP-country, and year fixed effects. The results reveal a statistically significant stumbling-block effect: a one-percentage-point increase in intra-REC trade share reduces EU–ACP bilateral trade by approximately 0.5–0.6 percentage points. At the sample mean intra-REC trade share of 11.6%, bilateral trade is approximately 6.3% lower; at the 90th percentile (25.5%), the estimated reduction reaches 13.4%. This pattern is robust across all seven RECs and is driven entirely by EU exports to ACP markets rather than ACP exports to the EU—consistent with intra-REC import substitution displacing European goods. Economic Partnership Agreements (EPAs) significantly attenuate the stumbling-block effect (interaction coefficient +1.048, $p < 0.05$), suggesting that deeper EU–ACP trade agreements can partially offset the trade-diverting consequences of regional integration. The findings carry important implications for the design of EPAs and the coordination of regional integration roadmaps with preferential trade arrangements.

Paper Outline

1. **Introduction**

   - Research question: does intra-ACP regional integration facilitate or impede EU–ACP bilateral trade?
   - The stumbling block versus building block debate, following Bhagwati (1993)
   - Preview of main findings and contribution to the literature
   - Policy relevance for EPA design and the post-Cotonou framework

2. **Institutional Background**

   - The Cotonou Agreement (2000): transition from non-reciprocal Lomé preferences to reciprocal EPAs
   - ACP regional groupings: ECOWAS, SADC, EAC, COMESA, Central Africa, CARIFORUM, and PIF
   - EPA implementation timeline: CARIFORUM (2008), Pacific Gateway (2009), ESA-4 (2012), Cameroon/Fiji (2014), SADC (2016), Mozambique (2018), Comoros (2019)
   - EAC EPA: initialled but not provisionally applied within the sample period

3. **Data and Descriptive Statistics**

   - Bilateral trade flows: BACI HS92 V202601 (CEPII), 1995–2021
   - Gravity covariates: CEPII Gravity Dataset V202211 (distance, common language, colonial relationship)
   - GDP and population: World Bank WDI; Cook Islands and Niue supplemented with manual entries
   - Panel structure: 78 ACP countries $\times$ 27 EU members $\times$ 27 years = 56,862 potential dyad-years; the estimation sample comprises 45,647 observations after conditioning on data availability
   - Key explanatory variable: intra-REC trade share (IT share), defined as intra-bloc exports plus imports as a share of total country trade, varying at the country–year level
   - SACU imputation: the five SACU member states are assigned the non-SACU SADC annual mean for years in which BACI intra-bloc flows are missing or zero
   - Summary statistics by REC: Table 1

4. **Empirical Strategy**

   - PPML gravity specification following Santos Silva and Tenreyro (2006)
   - Fixed effects: exporter $\times$ year, ACP country, and year

- Fixed effects rationale: importer × year fixed effects would absorb the IT share and EPA indicators, both of which vary only at the ACP-country × year level; splitting these into ACP-country and year fixed effects preserves identification while controlling for common time-period shocks
- Identification: within-country variation in the IT share over time, exploited across 27 EU partner observations per country–year
- Secondary specification: IT intensity, defined as the IT share normalized by the bloc's share of world trade
- Interaction specification: EPA × IT share, to test whether EPA coverage moderates the stumbling-block effect

5. **Main Results**

- Column (1) baseline: distance -1.729^{***}; common language $+1.107^{***}$
- Column (2): IT share coefficient -0.564^{*} (s.e. 0.322), confirming the stumbling-block hypothesis
- Column (3): EPA × IT share interaction $+1.048^{**}$; EPAs attenuate the stumbling-block effect; a sign reversal would require an IT share exceeding 0.60, which lies outside the sample support
- Column (4): IT intensity -0.006^{***}; the stumbling-block finding is robust to the choice of integration measure
- Column (5): OLS (zero-trade pairs excluded) -1.478^{***}; directionally consistent with the PPML baseline
- Marginal effects: -6.3% at the mean IT share (11.6%); -13.4% at the 90th percentile (25.5%)
- Figure 1: IT share distribution and time-series trends by REC
- Figure 2: IT share versus EU–ACP trade scatter plots by REC, with uniformly negative fitted slopes

6. **Mechanisms and Heterogeneity**

- Trade direction: the stumbling-block effect is driven by EU exports to ACP markets (-1.027^{***}) rather than ACP exports to the EU (-0.059, insignificant), consistent with intra-REC import substitution displacing European goods
- REC subsamples: all seven RECs yield negative point estimates; five of six interpretable estimates are statistically significant; the range spans -0.75 (Central Africa, insignificant) to -3.02^{***} (EAC)
- SADC EPA coefficient: $+0.408^{***}$; staggered EPA entry across SADC members generates genuine within-REC identification

- PIF instability: a positive distance coefficient (+13.87) indicates a poorly conditioned PPML solution; PIF is therefore excluded from coefficient stability plots
- Regional subsamples: Africa −0.357 (insignificant); Caribbean −2.327**; heterogeneity across African blocs attenuates the pooled African estimate
- Figure 2: forest plot of REC-level coefficients with 95% confidence intervals (PIF excluded); marginal effects curve with REC mean IT shares indicated

7. **Robustness Checks**

- Negative binomial PML: coefficient −0.458 (s.e. 0.360), approximately 81% of the PPML baseline, confirming that overdispersion does not materially bias the PPML standard errors
- Sample beginning in 1998: −1.336***, suggesting that sparse BACI coverage in the earliest years attenuates the baseline estimate
- Excluding South Africa: −0.460 (insignificant); excluding Nigeria: −0.344 (insignificant); the dominant traders carry substantial identification weight in the aggregate specification
- Excluding SACU members: −1.590***, indicating that the SACU imputation attenuates rather than generates the main finding
- Excluding Somalia and Eritrea: −0.569*; near-zero trade volumes have no material influence on the results
- Excluding CARIFORUM: −0.420 (insignificant); excluding PIF: −0.506 (insignificant); reduced cross-bloc variation is expected to widen standard errors in both cases
- OLS $\log(1+y)$ specification: sign reversal is a well-documented artefact of the near-zero transformation and should not be interpreted substantively

8. **Conclusion**

- The stumbling-block effect is strong and consistent: IT share coefficients range from −0.36 to −1.59 across alternative sample cuts and from −0.75 to −3.02 across individual RECs
- The effect is concentrated in the EU-to-ACP trade direction, consistent with intra-REC import substitution displacing European goods rather than a reorientation of ACP export flows
- EPAs partially offset the stumbling block, but their moderating influence requires simultaneous advancement of both regional integration and preferential trade agreements—sequential implementation is unlikely to achieve the same result
- Policy implications: EPA conditionality should be designed to account for the trade-diverting phase of regional integration; integration roadmaps and EPA liberalization schedules should be formally coordinated

- Limitations and future work: causal identification relies on within-country time variation in the IT share; no exogenous shock to integration intensity is exploited in the current framework; future research could employ specific tariff liberalization episodes or corridor infrastructure investments as instruments for the IT share

Summary Statistics

Table 1: Summary Statistics by Regional Economic Community

REC	# Countries	Mean IT Share (%)	SD IT Share	Mean EU–ACP Trade ($ thousands)	EPA Active
SADC	8	29.9	22.6	247	Yes (2016–)
EAC	5	14.6	7.1	45	No
ECOWAS	16	13.9	9.2	136	Yes (2014–)
CARIFORUM	15	14.5	8.8	26	Yes (2008–)
COMESA	12	4.3	3.6	36	Partial
Central Africa	7	5.0	4.2	73	Yes (2014–)
PIF	15	4.0	6.3	7	Partial
Full sample	78	11.6	—	—	—

Notes: Panel comprises 78 ACP countries paired with EU-27 over 1995–2021. IT Share is defined as intra-bloc exports plus imports as a share of total country trade. Mean Trade is the mean bilateral EU–ACP trade flow per dyad-year in thousands of USD. EPA Active indicates the year from which an EPA is in force for at least one bloc member. The EAC EPA indicator is zero throughout the sample, as the EU–EAC agreement was never provisionally applied. Elevated SADC IT shares reflect in part the SACU imputation procedure described in Section 3.

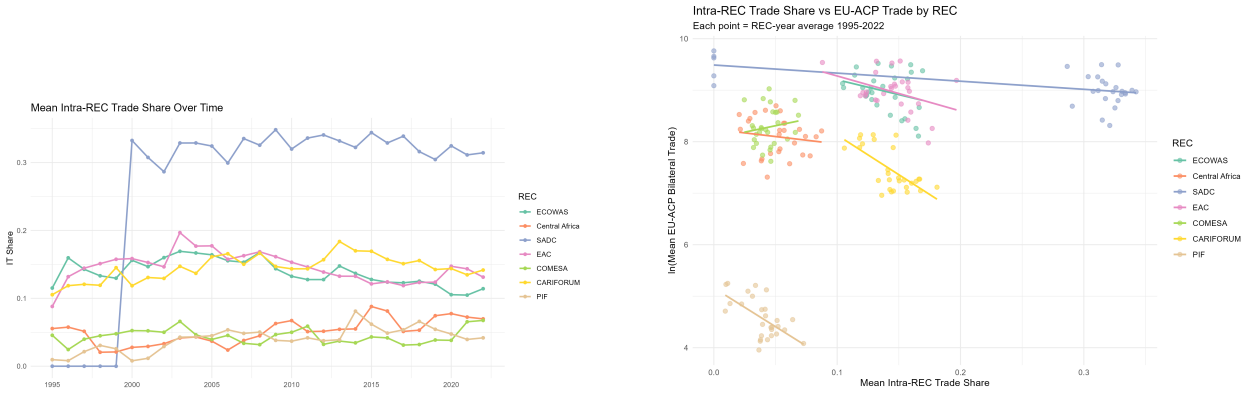
Main Results Table

Table 2: Intra-REC Trade Integration and EU–ACP Bilateral Trade

	Baseline PPML (1)	IT Share PPML (2)	IT × EPA PPML (3)	IT Intensity PPML (4)	IT Share OLS (5)
Dyadic controls					
ln(Distance)	−1.729***	−1.786***	−1.786***	−1.767***	−1.173***
	(0.609)	(0.644)	(0.644)	(0.642)	(0.239)
Common Language	1.107***	1.118***	1.118***	1.115***	0.674***
	(0.218)	(0.223)	(0.223)	(0.222)	(0.125)
Colonial Tie	0.201	0.188	0.188	0.180	1.255***
	(0.231)	(0.235)	(0.235)	(0.235)	(0.203)
ACP policy variables					
EPA (in force)	−0.018	−0.019	−0.139*	−0.044	−0.174***
	(0.049)	(0.049)	(0.075)	(0.045)	(0.046)
Intra-REC Trade Share		−0.564*	−0.625*		−1.478***
		(0.322)	(0.320)		(0.236)
EPA × IT Share			1.048**		
			(0.477)		
IT Intensity				−0.006***	
				(0.002)	
Fixed effects					
Exporter × Year	Yes	Yes	Yes	Yes	Yes
ACP Country	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Observations	46,160	45,647	45,647	45,317	42,305
R^2					0.755

Notes: Pair-level clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, (*) $p < 0.10$. Panel: 78 ACP countries × EU-27 × 1995–2021. Columns (1)–(4) estimated via PPML; column (5) via OLS on log(trade) with zero-trade pairs excluded. The EAC EPA indicator is zero throughout the sample period, as the EU–EAC EPA was never provisionally applied. At the mean IT share (11.6%), column (2) implies a 6.3% reduction in bilateral trade; at the 90th percentile (25.5%), the implied reduction is 13.4%. The EPA interaction in column (3) attenuates the stumbling-block effect for EPA-active country-years; a sign reversal would require an IT share exceeding 0.60, which lies outside the sample support.

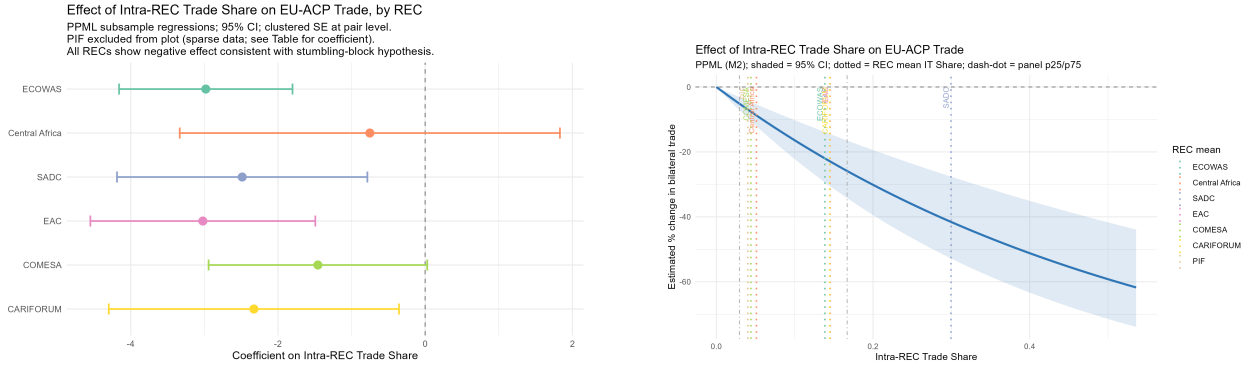
Figures



(a) IT Share Trends by REC

(b) IT Share vs. EU–ACP Trade by REC

Figure 1: Regional Integration and EU–ACP Trade: Descriptive Evidence. Panel (a) plots mean intra-REC trade shares over time, disaggregated by REC. Panel (b) plots REC-year average IT shares against mean log EU–ACP bilateral trade; fitted lines are estimated by OLS within each panel.



(a) REC-Level Coefficient Estimates

(b) Marginal Effects Curve

Figure 2: Effect of Intra-REC Trade Share on EU–ACP Bilateral Trade. Panel (a) presents PPML within-REC IT share coefficients with 95% confidence intervals; PIF is excluded due to model instability. Panel (b) plots the estimated percentage change in bilateral trade as a function of the IT share, derived from column (2) of Table 2; the shaded band denotes the 95% confidence interval; vertical dotted lines indicate REC mean IT shares; dot-dash lines mark the interquartile range.

Robustness Check Summary

Table 3: Robustness Checks: Intra-REC Trade Share Coefficient

Specification	IT Share Coefficient	Standard Error
Baseline PPML	-0.564^{*}	(0.322)
Negative binomial PML	-0.458	(0.360)
Sample beginning 1998	-1.336^{***}	(0.326)
Excluding South Africa	-0.460	(0.357)
Excluding Nigeria	-0.344	(0.317)
Excluding SACU members	-1.590^{***}	(0.403)
Excluding Somalia & Eritrea	-0.569^{*}	(0.322)
Excluding CARIFORUM	-0.420	(0.340)
Excluding PIF	-0.506	(0.318)

Notes: All specifications follow column (2) of Table 2 with exporter $\times$ year, ACP country, and year fixed effects. Pair-level clustered standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, $^{(*)}$ $p < 0.10$.