

Agricultural Trade Flows among Developing Countries: Do Trade Agreements make a Difference?



Gelson Tembo and T.S. Jayne

Presented at the
27th International Conference of Agricultural Economists
Held at the Beijing International Convention Centre, Beijing, China
August 16-22, 2009



Plan of the presentation

- Introduction
 - Motivation
 - Objectives
- Analytical framework
- Specification and estimation
- Data and data sources
- Results
- Summary and conclusions



Introduction

- SADC presents great potential for trade
 - 14 members; 6 share borders with Zambia
 - > 200 million inhabitants
 - > US \$180 billion total GDP
- BUT intra-regional trade below potential
 - Tariff and non-tariff barriers
 - NTBs: Licenses, permits, quotas, prohibitions, confinements, export subsidies
 - High production and marketing costs



Introduction (2)

- The SADC Trade Protocol
 - Enacted in 1996 but commenced in 2000
 - Provides a framework for reform
 - Liberalized intra-SADC trade
 - Phased removal of barriers



Motivation

- Anecdotes → barriers still exist!!
- A dearth of hard evidence
 - Determinants of intra-SADC agric trade
 - Impact of the SADC-TP
- Needed to foster integration, welfare



Two objectives

- Determinants of intra-SADC trade for a member state, Zambia
- Impact of SADC-TP on agric imports and exports



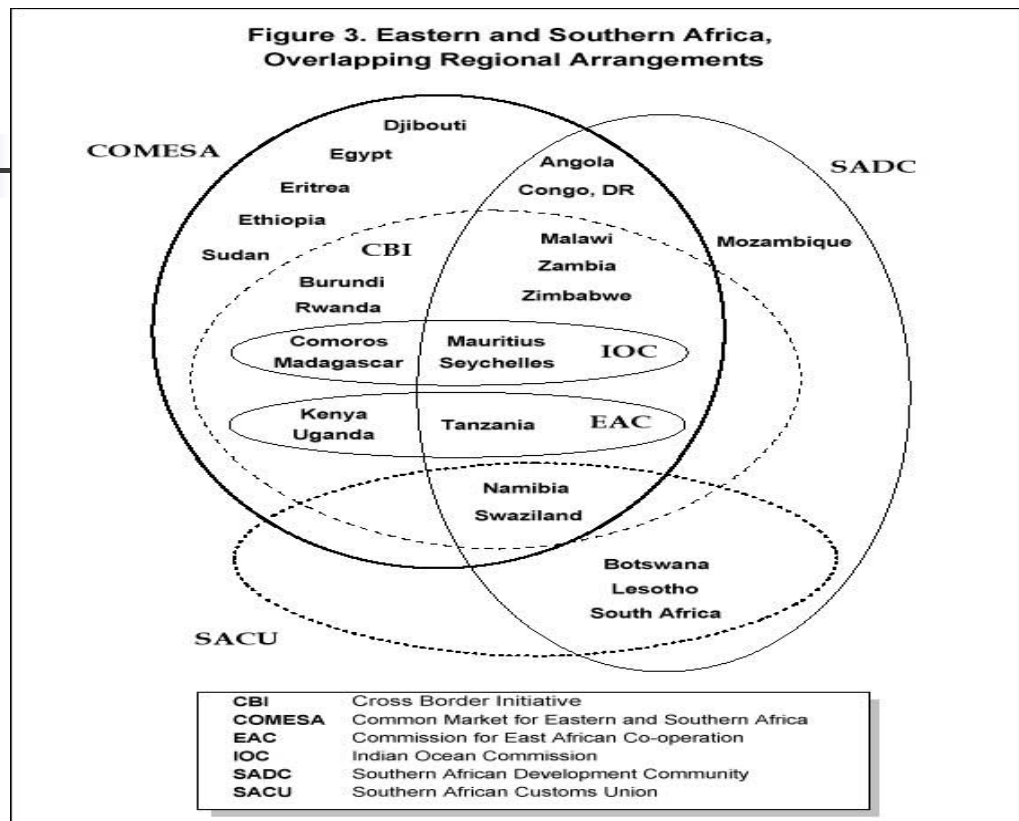
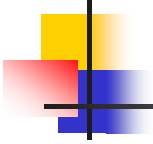
Analytical framework

- We use the Gravity model
 - Reduced form of structural trade models (Deardorff 1995)
 - Asserts that bilateral trade is
 - Directly correlated with incomes – size proxy
 - Inversely related to distance
 - Foreign investment policy
 - Geographical, political, trade policy/status



Specification and estimation

- Key issue 1: trading-pair heterogeneity
- The model → multiplicative
$$\ln y_{ijt} = \beta_0 + c_{ij} + \delta'z + \sum_k^K \beta_k \ln x_k + \varepsilon_{ijt}$$
- Where c_{ij} = unobserved effects
 - $\mathbf{x} = [x_k]$ vector of gravity variables plus governance index
 - \mathbf{z} = dummies, incl. common membership to RECs



Specification and estimation (2)

- Key issue 2: RE versus FE
 - Standard Hausman test inappropriate:
 - Panel-level heteroskedasticity (LR test)
 - Panel autocorrelation (wooldridge's test)
 - Cross-sectional dependence (Pesaran's test)
 - Panel-robust auxilliary regression approach (Cameron and Trivedi 2005)
 - →→ FE



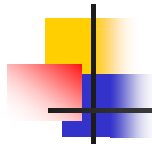
Specification and estimation (3)

- Estimation by cluster-corrected FE estimator
 - Correction necessary due to heteroskedasticity and serial correlation
- Impact of SADC-TP
 - $dsadctp = I(\text{Year} > 2000)$
 - Chow test \leftrightarrow structural change
 - $H_0: \beta[dsadctp]=0, \beta[\text{interactions}] = 0$



Specification and estimation (4)

- Selected interactions
 - COMESA
 - Before SADC-TP $\gg H_0: \beta[dcomesa]=0$
 - During SADC-TP
 - $H_0: \beta[dcomesa]=0, \beta[dcomesa * dsadctp] = 0$
 - Political stability
 - Before SADC-TP $\gg H_0: \beta[\text{stability}_t]=0, \beta[\text{stability}_{t-1}]=0$
 - During SADC-TP
 - $H_0: \beta[\text{stability}_t]=0, \beta[\text{stability}_{t-1}]=0,$
 $\beta[dsadctp*\text{stability}_t]=0, \beta[dsadctp*\text{stability}_{t-1}]=0$



Data and data sources

- 11 years of country-level panel data
 - 5 years before the SADC-TP (1996-2000)
 - 6 years post-SADC-TP (2001-2006)
- Assembled from various sources:
 - Zambian government departments
 - SADC reports & website
 - Other web sources: UN, WB, IMF, AGOA, etc



Data and data sources (2)

- Distances to Mauritius and Seychelles by a web-based algorithm (as-the-bird-flies)
- Political stability point estimates from the WB Governance & Anti-corruption website www.worldbank.org/wbi/governance
 - Level and first lag (collinear → joint)
 - Almon lag variables?
 - Equally collinear
 - Data limitations could not permit long lag lengths




Results

- Standard gravity variables largely consistent with expectations
 - Sizes of trading partners (GDP)
 - Positive BUT insignificant
 - Zambia's FDI inflow
 - Positive and significant in all models



Part of the regression output

Variable	All SADC partners		Excluding RSA	
	Export (1)	Import (2)	Export (3)	Import (4)
Intercept	-188.956+ (117.889)	-337.134 (194.482)	-173.548 (116.773)	-276.781 (204.548)
Log of partner GDP	7.965+ (4.946)	8.825 (9.292)	7.168 (4.916)	7.205 (8.843)
Log of partner per capita GDP	-9.139+ (5.611)	-8.102 (10.133)	-8.324 (5.530)	-7.346 (9.217)
Log Zambia GDP	1.642 (1.229)	6.961+ (4.256)	1.589 (1.417)	6.174 (4.947)
Log Zambia GDP per capita	-0.030 (0.157)	-0.101 (0.150)	-0.057 (0.162)	-0.246+ (0.144)
Log of partner FDI	-0.070 (0.134)	-0.102 (0.403)	-0.094 (0.155)	-0.373 (0.503)
Log of Zambia FDI	0.957** (0.359)	1.208*** (0.286)	1.001** (0.334)	1.178*** (0.303)
Comesa dummy,1=member	-0.783* (0.363)	-1.920 (1.904)	-0.725* (0.321)	-2.845** (1.224)
AGOA dummy, 1=eligible	0.368 (0.885)	0.046 (0.819)	0.356 (0.873)	0.241 (0.652)
F statistic	7.1 x 10 ⁸ ***	5.163**	19.97***	19.44***
Adjusted R-squared	0.651	0.497	0.664	0.548



Results (2)

- Trade agreements

- SADC-TP

- Imports → Unambiguously positive & significant
 - 39% larger with RSA
 - Exports → Only in the model that includes RSA

- COMESA

- Positive during SADC-TP,
 - Significant in import model without RSA



Joint tests

Test description	All SADC partners		Excluding RSA	
	Export	Import	Export	Import
	(1)	(2)	(3)	(4)
SADC-TP (Chow)	39.84*	163.86**	30.23	117.56***
Political stability	0.69	1.11	1.04**	2.98***
COMESA	1.16	0.28	1.43	2.08*



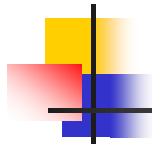
Results (3)

- Political stability
 - Effects more defined in the SADC-TP period
 - Consistently positive in models without RSA
 - Significant at 5% in the import model



Summary and conclusions

- Zambia's agricultural trade
 - Driven by
 - Economic sizes (GDP)
 - FDI
 - Supermarkets, NTEs
 - More responsive on the import side
 - Comparative disadvantages?
 - Supply responsiveness?



Summary and conclusions (2)

- RSA overshadows trade relationships with other countries
 - SADC-TP effects largest with respect to imports from RSA
 - COMESA effects visible during SADC-TP
 - But significant only without RSA
 - RSA not a member of COMESA



Summary and conclusions (3)

- Governance of member countries important
 - Effect more defined during SADC-TP
 - Less so when RSA is included
 - RSA is the largest trading partner
 - RSA has consistently larger governance indices
- Structural rigidities still an issue
 - Policy (export bans, import tariff effects)
 - Production and marketing costs



Thank you!!