

Domestic Support and Agricultural Factor Shares in GTAP v7 Data Base

Badri Narayanan G.
Center for Global Trade Analysis
Purdue University

Outline

- **Introduction**
- **OECD Domestic Support in GTAP 7 Data Base**
 - **Motivation**
 - **Methodology for non-EU member regions**
 - **Equalization of rates across crop sectors (EU)**
- **Agricultural Factor Shares**
 - **Motivation**
 - **Regions Updated**
 - **Methodologies for each region**

Introduction

- **Agricultural domestic support and factor shares:**
 - **Crucial for studies investigating impacts of policy measures on agricultural production**
 - **Both are related to cost of factors of production to agricultural firms & income of households from the employment of these factors**
 - **Significant improvements have been made in both these aspects in GTAP 7 Data Base**

OECD Domestic Support in GTAP 7 Data Base

Motivation

- **Prior to v7: Sector-specific payments to calculate Power of Support (POS)**
- **Recent efforts to decouple support from production of particular goods → How much support is actually sector-specific?**
- **New OECD data on domestic support payments:**
 - **Activity-specific: for individual sectors.**
 - **Group-specific: for a group of sectors**
 - **Activity-generic: for all agricultural sectors**
 - **Other transfer: for all sectors and factors**

OECD Domestic Support in GTAP 7 Data Base

Methodology for non-EU Member Regions

Step 1. Split the production of OECD's agricultural sectors to GTAP level, using GTAP I-O table-based shares

Step 2. Other transfers:

- 1. Allocate across land, labor & capital based on the factor's share in the value added**
- 2. Add this to activity-generic payments**

Step 3. Group-wise payments:

- 1. Targeted at a part of production – so scale down production in each sector in each group, using the GTAP I-O table-based shares**
- 2. Impose the group-average POS to each sector to get activity-specific payments**
- 3. Add this to activity-specific payments**

OECD Domestic Support in GTAP 7 Data Base (Contd...)

Methodology for non-EU Member Regions (Contd...)

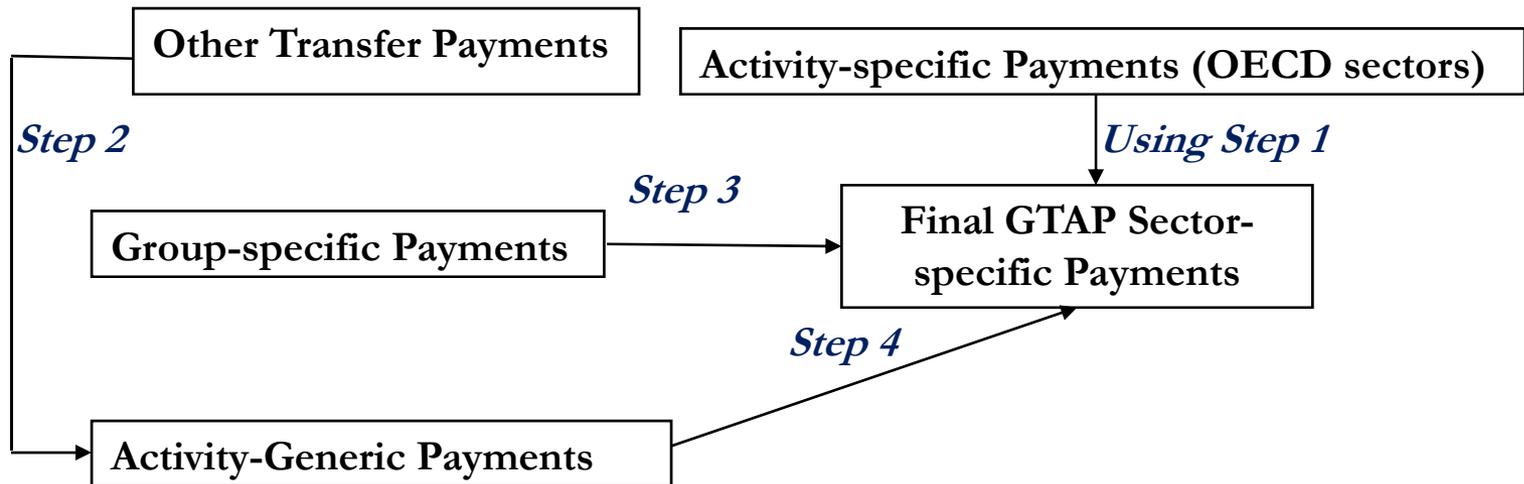
Step4. Activity-generic payments:

- 1. Impose the activity-generic POS across all the activities to obtain payments for all sectors**
- 2. Add these payments to activity-specific payments**
- 3. Calculate the final activity-specific POS based on all these activity-specific payments, obtained from these steps**

The New OECD Domestic Support in GTAP 7 Data Base (Contd...)

Methodology for non-EU Member Regions (Contd...)

Summary



OECD Domestic Support in GTAP 7 Data Base

- **Equalization of Rates across Crop-Sectors**
 - **The new format of data is not available for the EU regions**
 - **Decoupled payments → better to assume equal rates for all crop-sectors**
 - **So we sum up the domestic support payments across crop-sectors and then impose the aggregate POS obtained thus for each of the crop-sectors for all EU regions.**

Agricultural Factor Shares

- **Motivation**

- **Non-agri sectors: capital payments=Value Added (VA) – labor costs**
- **VA in agriculture has volatile returns → capital payments as calculated above may be <0**
- **In GTAP, we use econometric studies of agricultural cost functions to get cost shares for a normal year, given output and relative prices**
- **GTAP 7 Data Base: we update the shares using newer studies based on better methodologies**

Agricultural Factor Shares

Updated Regions

COUNTRY	Labor Share		Capital Share	
	GTAP v6 DB	GTAP v7 DB	GTAP v6 DB	GTAP v7 DB
Nepal	38	57	18	14
Canada	39	41	44	43
Peru	47	60	25	5
South Africa	40	34	45	52
Zimbabwe	60	41	25	28

Source: Hertel and Tsigas (2002), Hertel, Tsigas and Narayanan (2009)

Agricultural Factor Shares

- **Methodologies for Each Region**
 - **Nepal:**
 - **Abdulai & Regmi (2000) – HH utility maximization approach with joint production & consumption**
 - **IV estimation using 1996 survey data with 280 HH observations**
 - **Advantages over GTAP6 DB shares: regional focus (earlier one was based on Indian data), methodology (family non-wage labor is accounted for).**

Agricultural Factor Shares

- **Methodologies for Each Region (Contd...)**
 - **Canada:**
 - **Echevarria (1997) – TFP procedure to estimate the shares for 1971-93, using VA production function, a restricted profit maximization with CRS & Hicks-neutral tech change.**
 - **Advantages over GTAP6 DB shares: methodology (time series; unpaid labor is accounted for), but both shares are almost equal.**

Agricultural Factor Shares

- **Methodologies for Each Region (Contd...)**

South Africa:

- **Thirtle *et. al.* (2000):** Derive input cost shares from first derivatives of profit maximization with respect to time, using time-series data on changes, 1947-91
- **Advantages over GTAP 6 DB shares:** methodology (time series; no econometric problems)

Zimbabwe:

- **Thirtle *et. al.* (1993):** similar to South Africa, but the less restricted Translog production function, 1970-89

Peru:

- **Jacoby (1993):** similar to Nepal, 1034 HH observations from Peruvian LSS (WB, 1985-86)

Thank You!

Questions/Comments?