Domestic Support and Agricultural Factor Shares in GTAP v7 Data Base

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Outline

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  – Equalization of rates across crop sectors (EU)

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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
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
Step 4. 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

Step 2
Other Transfer Payments

Step 3
Group-specific Payments

Activity-specific Payments (OECD sectors)

Using Step 1

Final GTAP Sector-specific Payments

Step 4
Activity-Generic Payments
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

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Labor Share</th>
<th>Capital Share</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GTAP v6 DB</td>
<td>GTAP v7 DB</td>
</tr>
<tr>
<td>Nepal</td>
<td>38</td>
<td>57</td>
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<td>Canada</td>
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<td>41</td>
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<td>Peru</td>
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<td>South Africa</td>
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<td>34</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>60</td>
<td>41</td>
</tr>
</tbody>
</table>

*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?