Impact of India’s Food Security Policy across Household Types

Presented by:
Angel H. Aguiar

Based on joint work with: Dileep K. Birur, RTI International, and Badri Narayanan G.

2015 IATRC Annual Meeting: “Trade and Societal Well-Being: Analysis of Food Consumption Patterns”
Clearwater Beach, FL. December 13-15, 2015
Outline

• **Introduction**
  • India’s National Food Security Act of 2013
  • Objective and approach

• **Data and Model**
  • Sources and development

• **Policy Scenarios**
  • Results

• **Conclusions**
  • Future work
Introduction: India’s NFSA

• In September 2013, the Government of India passed the National Food Security Act 2013 (NFSA) also called the Right to Food Act,
  • The NFSA aims to provide subsidized food grains to nearly two thirds India’s population

• Covers 75% of the rural population and 50% of the urban population
  • “Priority” Group (BPL) : 46% rural and 28% urban
  • “General” Group (APL) : 28% rural and 22% urban

• NFSA is regarded as the biggest experiment in the world to achieve food and nutritional security (Gulati et al. 2012)
Introduction: India’s NFSA

• The NFSA entitlement is 35 kg of food grains per “Priority” household per month at issue prices of:
  • 4.5¢ per kg of rice
  • 3.0¢ per kg of wheat
  • 1.5¢ per kg of coarse grains (millets).

• For “General” group, the NFSA entitlement is 20 kg of food grains per household per month at 50% of the minimum support price

• Full implementation of the NFSA is estimated cost $22 billion and with more than 60 million tons of food grains
Introduction: India’s NFSA

- NFSA entitles pregnant women, lactating mothers, and children from 6 months to 14 years to a FREE nutritious “take home ration” of 600 calories and $100 as maternity benefit for six months
  - Not accounted for it here
- Adoption of NFSA still ongoing by the states
## India’s Subsidy Costs

<table>
<thead>
<tr>
<th>Subsidy</th>
<th>2014-2015 (USD billion)</th>
<th>2015-2016 (USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Subsidy (NFSA)</td>
<td>20.45 (14.75)</td>
<td>20.74 (10.83)</td>
</tr>
<tr>
<td>Fertilizer Subsidy</td>
<td>11.83</td>
<td>12.16</td>
</tr>
<tr>
<td>Petroleum Subsidy</td>
<td>10.05</td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Total Subsidy</strong></td>
<td><strong>42.33</strong></td>
<td><strong>37.90</strong></td>
</tr>
</tbody>
</table>

Source: Budgets from Government of India (2015)
Objective

• To analyze the impact of NFSA, in an economy wide framework that accounts for multiple household types and multiple endowment factors
Data Sources

- GTAP v8.1 data base
  - 2007 ref. year, 134 regions and 57 sectors (Narayanan et al. (Ed.), 2012)

- India’s National Sample Survey
  - data on income and expenditure, by quintiles

- India’s Census data
  - For rural and urban households classification
Data work

• GTAP data base for all countries except for India
• For India, we use the MyGTAP data program (Minor and Walmsley, 2013) to split the households and factors:
  • Household consumption share across all sectors,
  • Factor ownership shares,
  • Shares on factor use, and
  • Households savings rate
Rural vs. Urban Households in India

Distribution of Rural and Urban Households in India (%)

<table>
<thead>
<tr>
<th>Census</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>89.2%</td>
<td>10.8%</td>
</tr>
<tr>
<td>1951</td>
<td>82.7%</td>
<td>17.3%</td>
</tr>
<tr>
<td>2011</td>
<td>68.8%</td>
<td>31.2%</td>
</tr>
</tbody>
</table>
Final Data Base

• The resulting data base from MyGTAP data program includes five categories of households each in rural and urban categories of India (hhr1, hhr2, hhr3, hhr4, hhr5; hhu1, hhu2, hhu3, hhu4, hhu5)

• The labor in India is classified as: unsk_rural, unsk_urban, skl_rural, skl_urban

• The capital in India is classified as agricultural and other capital: AgCapital and OCapital;

• The data base is aggregated to 10 regions and 28 sectors
## Disaggregation of Sectors

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Description</th>
<th>Sectors</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy Rice</td>
<td>Paddy rice</td>
<td>BeverTobac</td>
<td>Beverages &amp; tobacco</td>
</tr>
<tr>
<td>Wheat</td>
<td>Wheat</td>
<td>ProcRice</td>
<td>Processed Rice</td>
</tr>
<tr>
<td>CrGrains</td>
<td>Cereal grains</td>
<td>VegOil</td>
<td>Other food products</td>
</tr>
<tr>
<td>VegsFruits</td>
<td>Vegetables &amp; fruits</td>
<td>Sugar</td>
<td>Processed Sugar</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>Oilseeds</td>
<td>ProcRum</td>
<td>Processed Ruminants</td>
</tr>
<tr>
<td>Sugarcrops</td>
<td>Sugar crops</td>
<td>ProcNRum</td>
<td>Processed Non Ruminants</td>
</tr>
<tr>
<td>PlantFibres</td>
<td>Plant Fibers</td>
<td>Coal</td>
<td>Coal</td>
</tr>
<tr>
<td>Oth Agri</td>
<td>Other Agri. Crops</td>
<td>CrudeOil</td>
<td>Crude oil</td>
</tr>
<tr>
<td>Ruminant</td>
<td>Ruminant Livestock</td>
<td>Electricity</td>
<td>Electricity</td>
</tr>
<tr>
<td>NonRumnt</td>
<td>Non Ruminants</td>
<td>NGas</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>DairyPrdts</td>
<td>Dairy Farms &amp; its products</td>
<td>Oil_pcts</td>
<td>Petroleum &amp; coal products</td>
</tr>
<tr>
<td>Forestry</td>
<td>Forestry</td>
<td>Water</td>
<td>Water sector</td>
</tr>
<tr>
<td>Fishery</td>
<td>Fishing sector</td>
<td>En_Int_Ind</td>
<td>Energy intensive industries</td>
</tr>
<tr>
<td>FoodPrd</td>
<td>Food products</td>
<td>Oth_Ind_Se</td>
<td>Other industry and services</td>
</tr>
</tbody>
</table>
## Disaggregation of Regions

<table>
<thead>
<tr>
<th>Regions</th>
<th>Comprising of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. India</td>
<td>ind</td>
</tr>
<tr>
<td>2. USA</td>
<td>usa</td>
</tr>
<tr>
<td>3. EU27</td>
<td>aut bel cyp cze dnk est fin fra deu grc hun irl ita lva ltu lux mlt nld pol prt svk svn esp swe gbr bgr rou</td>
</tr>
<tr>
<td>4. China</td>
<td>chn hkg</td>
</tr>
<tr>
<td>5. RoSEAsia</td>
<td>jpn kor mng twn xea khm idn lao mys phl sgp tha vnm xse bgd npl pak lka xsa</td>
</tr>
<tr>
<td>6. MENA</td>
<td>bhr irn isr kwt qat sau tur are xws egy mar tun xnf</td>
</tr>
<tr>
<td>7. SSAfrica</td>
<td>ben bfa cmr civ gha gin nga sen tgo xwf xcf xac eth ken mdg mwi mus moz rwa tza uga zmb zwe xec bwa nam zaf xsc</td>
</tr>
<tr>
<td>8. Brazil</td>
<td>bra</td>
</tr>
<tr>
<td>9. LatinAmerica</td>
<td>mex xna arg bol chl col ecu pry per ury ven xsm cri gtm hnd nic pan slv xca xcb</td>
</tr>
<tr>
<td>10. RestofWorld</td>
<td>aus nzl xoc can che nor xef alb blr hrv rus ukr xee xer kaz kgz xsu arm aze geo xtw</td>
</tr>
</tbody>
</table>
MyGTAP Model

• Standard GTAP relationships, except for country of interest
• Government income
  • Receives all tax revenues
  • Accounts for net foreign aid flows
• Multiple regional households income
  • Factor payments, allows for government transfers
  • Accounts for net remittances
• Government and Private Savings determine country savings
GTAP Model: One region
MyGTAP Model: One region
MyGTAP Model: Multi-region
Experimental Design

- **Scenario A. Implementing NFSA**
  - We compute the power of the *ad valorem* equivalent (ADV) subsidy provisions for Processed Rice and Wheat
  - Implement different magnitudes of subsidy shocks across the selected households: hhr1, hhr2, hhr3, hhr4; hhu1, hhu2

- **Scenario B. Removal of Food Consumption Subsidy**
  - Based on the policy distorted economy from (A), we fully remove food consumption subsidies (different magnitudes) across all the ten rural and urban household types (including pre-NFSA consumption subsidies)
Experimental Design

• **Scenario C. Income Transfers**
  
  • Based on the population weights as well as the total subsidy cost implicit in NFSA (22 billion US$),
    
    • we simulate income transfers to 4 bottom quintiles of the rural and 2 bottom quintiles of the urban households.
Scenario A

Implementing Food Subsidies
Results A: Change in Consumption across Rural HH (%)

- Dramatic consumption changes in BPL households (hhr1, hhr2, hhr3)
- In the lowest quintile rural household, consumption of processed rice increased by >78% and that of wheat increased by >16%.
- Slight increase in consumption of other commodities (meat, other food categories).
Results A: Change in Consumption across Urban HH (%)

- Only the lowest quintile urban household showed significant increase in consumption of processed rice (>67%) and that of wheat (>12%)
- Slight increase in consumption of other commodities (meat, other food categories).
Results A: Urban vs. Rural - Lowest Quintile HH Consumption (%)

• Though magnitude of the subsidy shock was same across the rural and urban lowest quintile households, impact on change in consumption of food differ considerably,
Results A: % Change in output
% change in the demand for value added
GDP in India dropped by about USD13 billion, mainly due to drop in government expenditure.
Scenario C

Income Transfers Alternative
Results C: Consumption

% Ch in Consumption Expenditure across Rural & Urban HH in India (Income Transfer Case)
Results C: Change in GDP

Change in GDP ($2007 Million)

- Consumption
- Investment
- Government Expenditure
- Exports
- Imports

India 2 USA 3 EU27 4 China 5 RoSEAsia 6 MENA 7 SSAfrica 8 Brazil 9 LatinAmerica 10 RestofWorld
## Effects on output

<table>
<thead>
<tr>
<th></th>
<th>Scenario A</th>
<th>Scenario C</th>
</tr>
</thead>
<tbody>
<tr>
<td>PaddyRice</td>
<td>10.43</td>
<td>0.71</td>
</tr>
<tr>
<td>Wheat</td>
<td>1.2</td>
<td>0.26</td>
</tr>
<tr>
<td>VegsFruits</td>
<td>-0.36</td>
<td>0.39</td>
</tr>
<tr>
<td>Oilseeds</td>
<td>-1.13</td>
<td>-0.11</td>
</tr>
<tr>
<td>PlantFibres</td>
<td>-1.73</td>
<td>-0.93</td>
</tr>
<tr>
<td>ProcRice</td>
<td>15.41</td>
<td>0.99</td>
</tr>
</tbody>
</table>
Conclusions

• NFSA policy in India showed significant change in consumption pattern of food grains, but not much impact was observed in consumption of other commodities such as livestock products

• Impact of subsidy on lowest quintile rural household was significantly high compared to lowest quintile urban households, for the same amount of subsidy

• Income Transfers: have secular impact on consumption of all food commodities
Extensions for the future

• Further work is on incorporating nutrition module to track impacts across vulnerable households.

• Other scenarios of income transfer and subsidy inclusion/exclusion: e.g. the role of realistic/limited changes in total government expenditure.

• Calibrate/validate consumption response to price changes, using empirical literature.
Questions or comments?