

The impacts of the Doha Round on Egypt

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WTO Doha Round

- Cut agricultural and non-agricultural tariffs worldwide
- Special treatment of developing countries
- Ongoing negotiations
- Our simulations based on a paper by Peter J. Minor (2006): The Doha Development Round and Projected Impacts on Egyptian Trade and Production: A Global CGE Analysis

Minor (2006) – Impact on Egypt

- GTAP 2001 database
- Modification made using ALTERTAX: MFA quotas were eliminated, EU enlargement, Egypt-US Qualified Industrial Scheme
- Looked at two different scenarios:
 - Without Sensitive Agriculture
 - With 2% Sensitive Agriculture
- Closure:
 - National savings adjust to maintain the current balance of trade for some regions
 - Real wage fixed for unskilled labor in developing countries (unemployment)

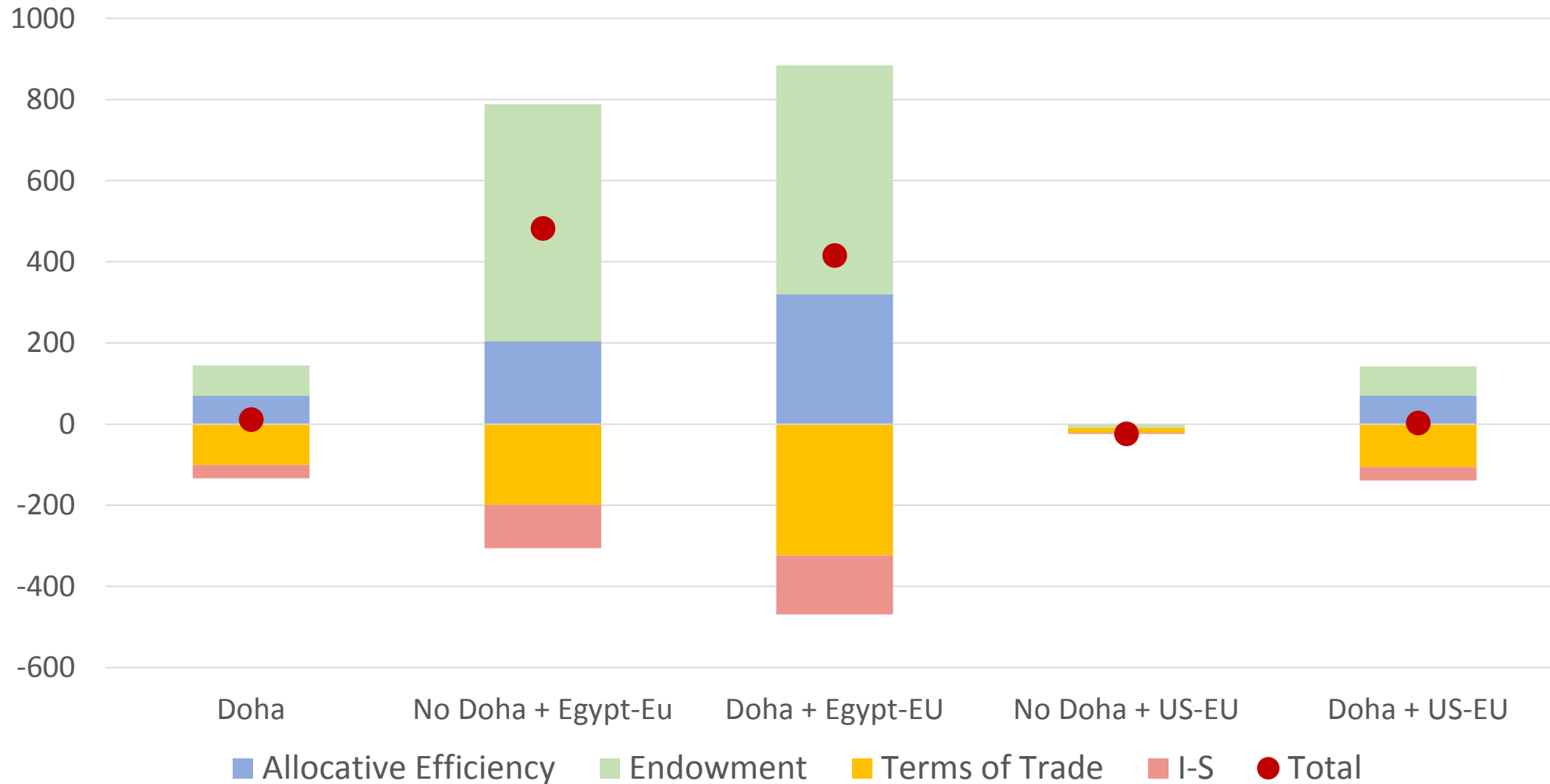
Extensions

- Group 1: Consider bilateral trade agreements in addition or instead of the Doha Round
- Group 2: Consider non-tariff measures and agricultural subsidies
- Group 3: Consider changes due to the Arab Spring
- Group 4: Updating of the baseline data to reflect current economic situation and compare potential effects of implementation of Doha today

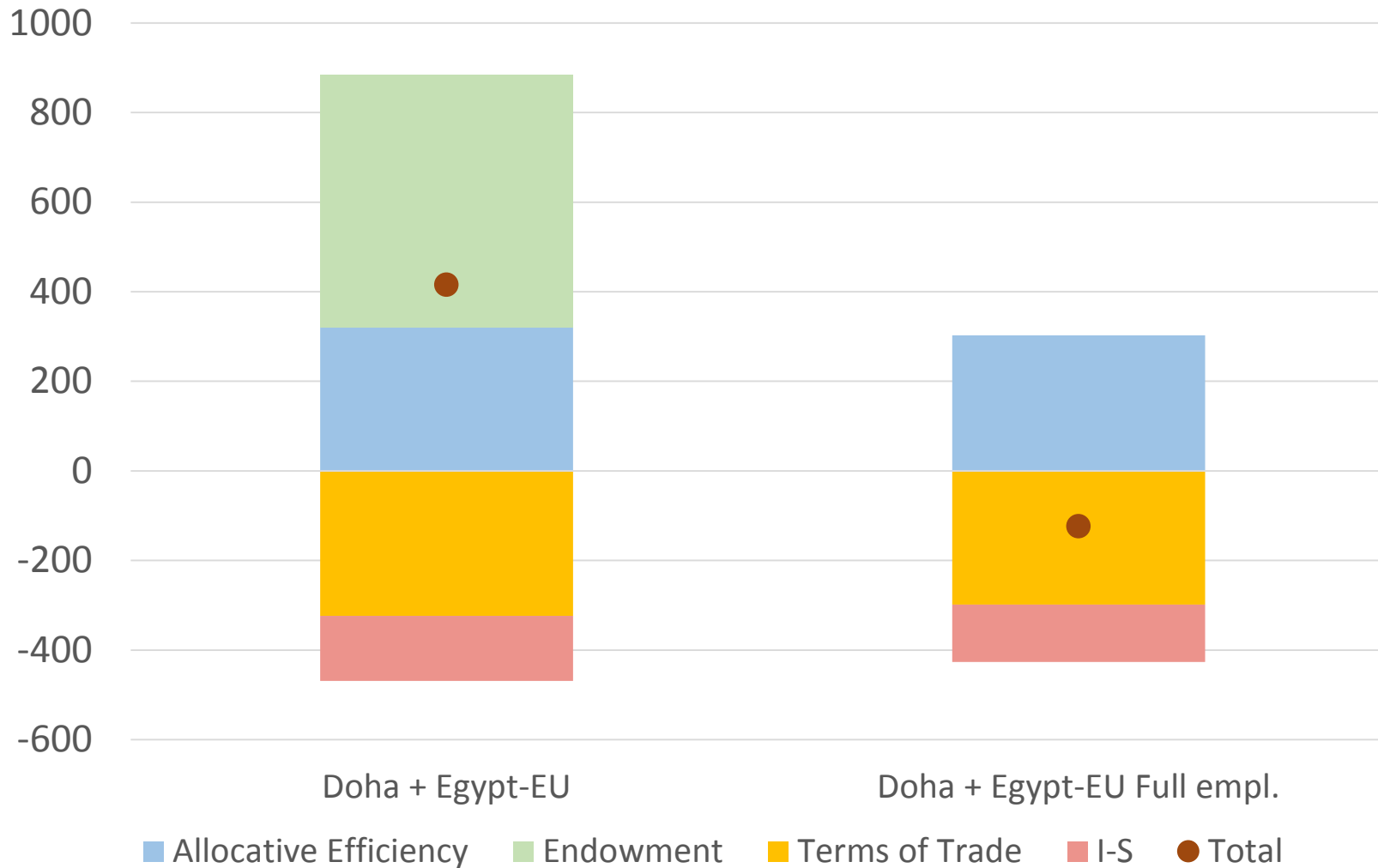
Group 1 - Introduction and scenarios

- Consider bilateral trade agreements in addition or instead of the Doha Round
- Doha + Egypt-EU FTA (with and without unemployment)
- No Doha + Egypt-EU FTA (with and without unemployment)
- Doha + EU-USA FTA
- No Doha + EU-USA FTA
- Compared to effects of the Doha round on Egypt (Peter Minor paper)

Welfare impacts – with unemployment



Welfare impacts – full employment



Changes in employment of unskilled labor

| | |
|--------------------|-------------|
| Doha | 0.28 |
| No Doha, Eg-EU FTA | 2.2 |
| Doha and Eg-EU FTA | 2.13 |

Terms of trade effect – Doha + Egypt-EU FTA

Price transmission

- Export prices (pfob) decrease in all sectors:
$$pfob(i,r,s) = pm(i,r) - tx(i,r) - txs(i,r,s);$$
- $pm(i,r) = \text{sum}(k, \text{PROD_COMM}, \text{REVSHR}(i,k,r) * pmes(i,k,r));$
- $pfe(i,j,r) = tf(i,j,r) + pmes(i,j,r);$
- $pf(i,j,r) = \text{FMSHR}(i,j,r) * pfm(i,j,r) + [1 - \text{FMSHR}(i,j,r)] * pfd(i,j,r);$
- $ps(j,r) + ao(j,r)$
$$= \text{sum}(i, \text{ENDW_COMM}, \text{STC}(i,j,r) * [pfe(i,j,r) - afe(i,j,r) - ava(j,r)])$$
$$+ \text{sum}(i, \text{TRAD_COMM}, \text{STC}(i,j,r) * [pf(i,j,r) - af(i,j,r)])$$
$$+ \text{profitslack}(j,r);$$
- Producer prices decrease as well in all sectors
- **Factor depreciation: pfactor(Egypt) = -1.14**
- Inputs cheaper → decrease in export prices → terms of trade effect driven by lower export prices

Trade effects

| | Exports | | | | Imports | | | |
|----------------------------|-----------------------------|--------|-----------------------|--------------------|-----------------------------|--------|-----------------------|--------------------|
| | Baseline 2001 (\$ millions) | Doha | No Doha but Eg-EU FTA | Doha and Eg-EU FTA | Baseline 2001 (\$ millions) | Doha | No Doha but Eg-EU FTA | Doha and Eg-EU FTA |
| Agricultural | 1092 | -0.20% | 36.35% | 17.65% | -3359 | 0.66% | -2.92% | -0.25% |
| Non-agricultural | 3125 | 0.07% | 3.42% | 3.55% | -13373 | -0.13% | -0.48% | -0.62% |
| Service | 8307 | 0.14% | 0.29% | 0.46% | -3995 | 0.11% | 0.17% | 0.29% |
| Energy & Mining | 1999 | 0.10% | 0.24% | 0.38% | -1117 | 0.15% | -1.15% | -0.96% |
| Total | 14524 | 0.09% | 3.67% | 2.41% | -21845 | 0.05% | -0.77% | -0.41% |

Trade results – Doha-Egypt-EU with unemployment

- Imports increase especially in the apparel, processed food and beverage sectors
- Imports decrease especially in some agricultural sectors, i.e. livestock, wheat
- There are decreases in exports in some sectors in the original simulation (Doha round) but in our simulations exports increase in every sector across scenarios

Output effects

| | total output (\$ million) | percentage change | Expansion | Substitution |
|----------------------------------|------------------------------|-------------------|-----------|--------------|
| Agricultural | 30226 | -1.14 | | |
| Processed Food and Beverage | 10261 | -6.10 | -6.334 | 0.238 |
| Live Stock and Diary | 5801 | 1.30 | -0.068 | 1.366 |
| Non-agricultural | 30727 | -0.91 | | |
| Apparel | 7136 | -3.56 | -4.242 | 0.683 |
| Textile | 6744 | -1.70 | -1.913 | 0.216 |
| Services | 73366 | 1.64 | | |
| Other services | 23745 | 1.08 | 0.435 | 0.643 |
| Trade and finance | 20753 | 1.07 | 0.475 | 0.594 |
| Transportation and communication | 14920 | 3.21 | n.a. | n.a. |
| Construction | 10243 | 2.25 | 2.145 | 0.11 |
| Electric distribution | 3705 | 0.33 | 0.325 | 0 |
| Total | 146634 | 0.44 | | |

Group 2: Non-Tariff Measures and Agricultural Subsidies

Silvia Sorescu

Minh Thu To

Motivation

Projected Impacts of the Doha Development Round on Egypt's Trade and Production (Peter Minor, 2006) → Focus on tariff rates reductions in agriculture and manufacturing

... missing out on other types of distortions and barriers affecting production and trade

- agricultural producer subsidies
- barriers to services trade
- non-tariff measures

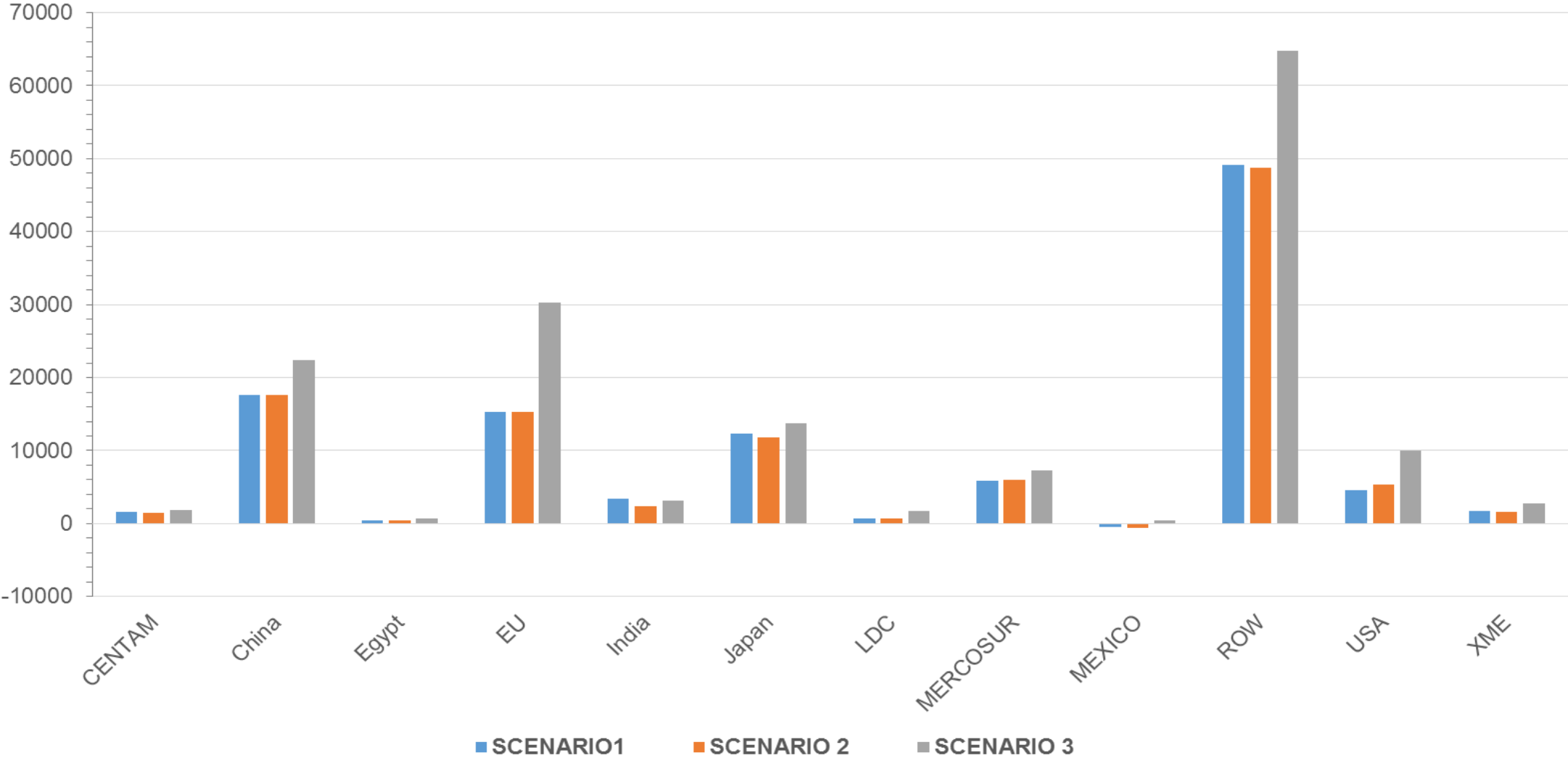
Database and scenarios

Updated database to include AVE of services (based on CEPII estimations) using Altax → updated tms for services sectors (construction, trade and finance, transport, electricity distribution)

- **Scenario 1:** Peter Minor (2006) tariff reductions agr and mnfcs + reduction in tms for services (20%)
- **Scenario 2:** Scenario 1 + reduction in agriculture producer subsidies (60% for developed countries and 40% for developing countries) → shock to in: cereals, fibers, paddy rice, processed rice, wheat
- **Scenario 3:** Scenario 2 + NTM reductions in agr and mnfcs

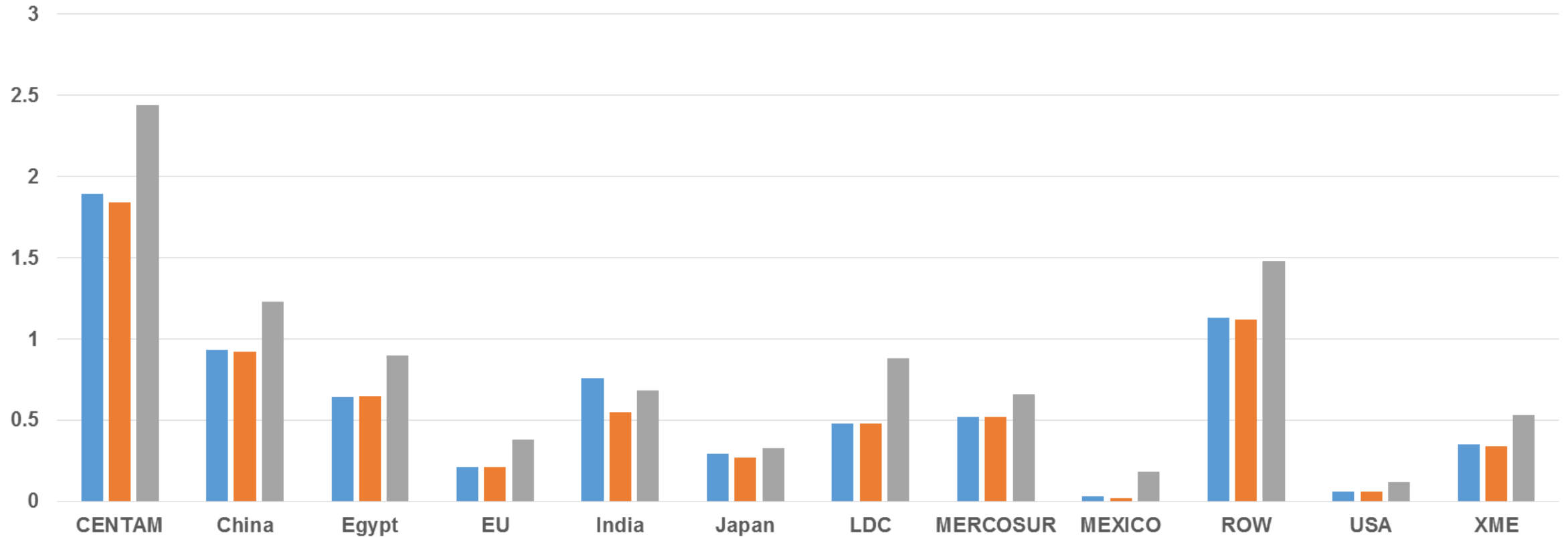
Welfare impacts by region

2001 USD million



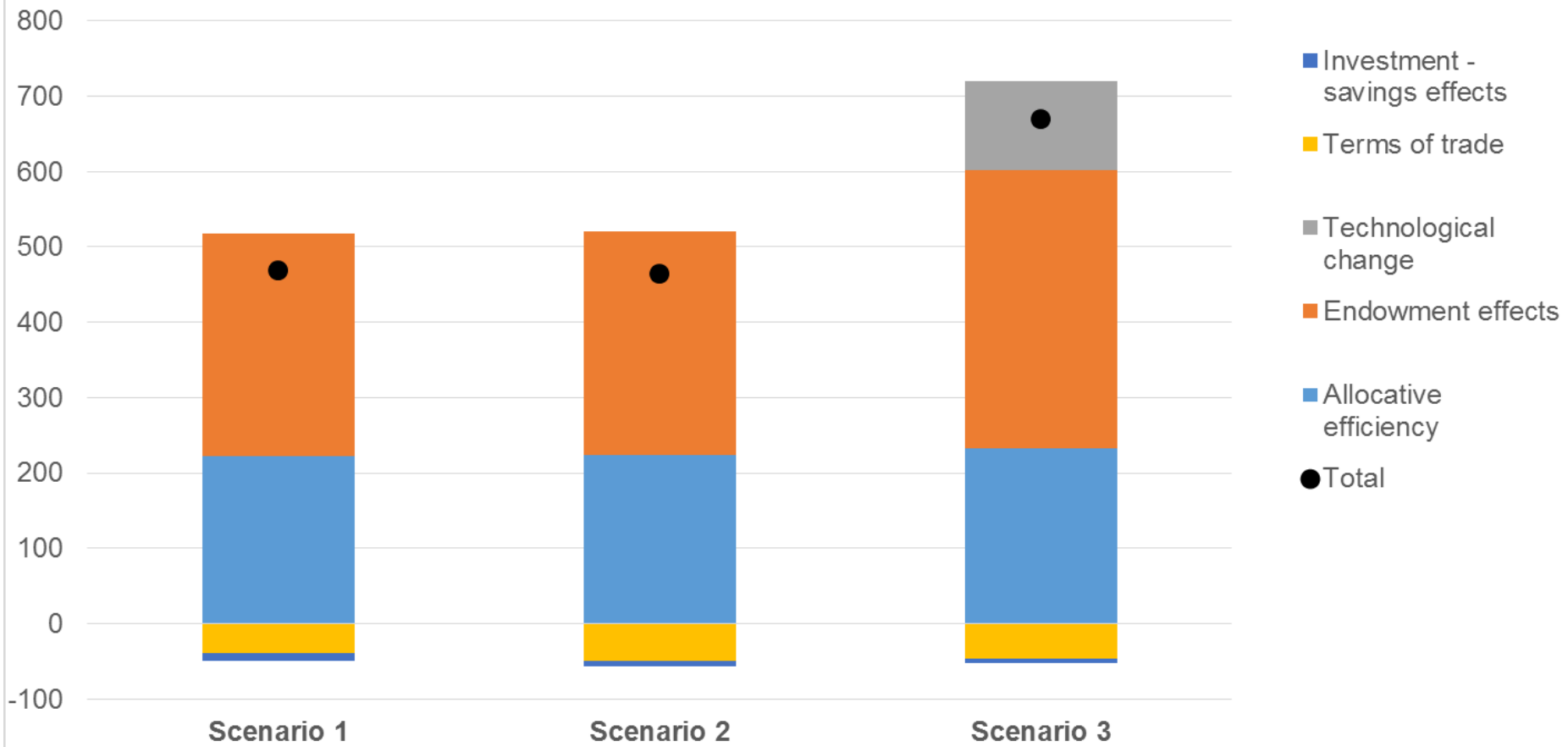
% change real GDP

■ 20% reduction NTM Services ■ Reduction of Agri Subsidies ■ Reduction of NTM Agri and Manf



Welfare decomposition Egypt - by scenario

2001 USD million



Production impacts - agriculture

| | 20% reduction NTM Services | | Reduction of Agri Subsidies | | Reduction of NTM Agri and Manf | |
|--------------------------------------|----------------------------|---------|-----------------------------|---------|--------------------------------|---------|
| | % change | mil USD | % change | mil USD | % change | mil USD |
| Cereal | 1.0 | 14.4 | 1.5 | 20.8 | 1.3 | 19.1 |
| Livestock | 1.5 | 85.9 | 1.5 | 83.4 | 1.5 | 85.1 |
| Fibers | -0.2 | -2.7 | 1.4 | 16.0 | 1.3 | 15.4 |
| Other Agriculture | 0.5 | 6.0 | 0.3 | 3.6 | 0.4 | 4.7 |
| Processed foods and Beverages | 0.5 | 48.5 | 0.4 | 43.6 | 0.6 | 61.1 |
| Paddy Rice | 1.2 | 16.2 | 1.5 | 19.3 | 1.7 | 22.7 |
| Processed Rice | 0.1 | 1.9 | 0.3 | 5.7 | 0.6 | 10.0 |
| Vegetable, Fruits, Nuts | 0.7 | 33.7 | 0.7 | 31.1 | 0.8 | 35.9 |
| Vegetable oils and fats | 0.2 | 1.6 | 0.0 | 0.2 | -0.5 | -4.7 |
| Wheat | 1.3 | 20.5 | 2.0 | 30.3 | 1.1 | 17.1 |

Trade effects

- Scenario 1: 20% reduction NTM Services
→ exports expand significantly across all services sectors
- Scenario 2: Sc 1+Reduction of Agri Subsidies
→ exports increasing in fibers and paddy rice sectors due to reduction of producer subsidies in major importing countries
- Scenario 3: Sc 2+Reduction of NTM Agri and Manf
→ services trade expansion higher than in Scenario 2
→ exports increase in all manufacturing sectors except for textiles

Group 3: DOHA Round-EGPYT-Arab Spring: effects of Negative capital shock

Simon Tsao & Kayenat kabir

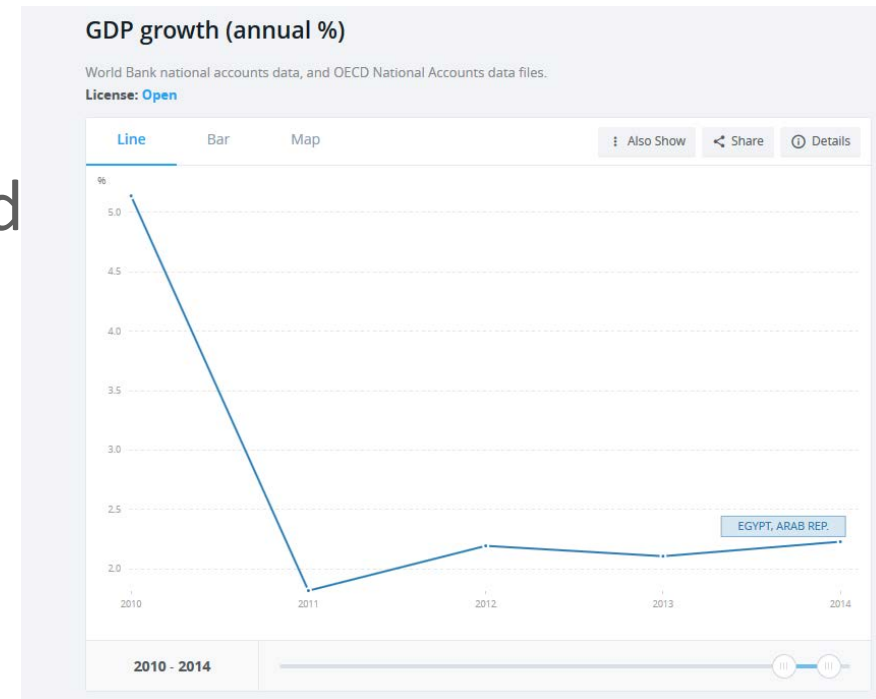
GTAP Short Course, 2016, west lafayette

Outline

- Motivation
- Experiments
- Results
 - Welfare decomposition
 - Exchange rate
 - Sectoral impacts
- Learning

During the Arab Spring in Egypt

- Annual **GDP** growth rate ↓ : 5.14% (2010) , 2.11% (2013), 2.23% (2014)
- Tourism, textile and construction industries hit hard
- Capital investment went down
- Investments shifted to energy intensive industry
- 20% of Egypt's budget spent on energy subsidy
- **Unemployment** rate ↑ : 8.9 % (2010), 13.4% (2014)



Experiment

- Estimate the marginal impact of decreased capital investment during Arab Spring to impacts of Doha round in Egypt
- Projected impacts of Doha Round in Egypt (Peter Minor, 2006)
- Extension: Shocked industrywide capital input by 5%

$q_0(\text{"Capital"}, \text{"Egypt"}) = -5$

- Unemployment for both skilled and unskilled labor made endogenous

Welfare Decomposition

Doha Round (Minor 2006 results)

| Region | Allocative Efficiency | Endowment Effect | Terms of Trade Effect | Investment-Savings Effect | Total Welfare Effect |
|----------------|-----------------------|------------------|-----------------------|---------------------------|----------------------|
| 1 CENTAM | 302 | 554 | 311 | -78 | 1,089 |
| 2 China | 2,163 | 5,735 | 3,353 | -413 | 10,838 |
| 3 Egypt | 70 | 74 | -101 | -33 | 11 |
| 4 EU | 6,602 | 0 | -3,510 | 154 | 3,246 |
| 5 India | 1,127 | 1,072 | -289 | 13 | 1,922 |
| 6 Japan | 8,875 | 0 | 1,020 | -163 | 9,732 |
| 7 LDC | -190 | -165 | -185 | -40 | -580 |
| 8 MERCOSUR | 513 | 373 | 1,399 | -18 | 2,266 |
| 9 MEXICO | 46 | -343 | -713 | 73 | -937 |
| 10 ROW | 15,496 | 11,666 | -242 | 497 | 27,417 |
| 11 USA | -254 | 0 | -943 | -20 | -1,217 |
| 12 XME | 48 | 0 | -131 | 32 | -51 |

Arab Spring + Doha Round vs. Doha Round

| Region | Allocative Efficiency | Endowment Effect | Terms of Trade Effect | Investment-Savings Effect | Total Welfare Effect |
|----------------|-----------------------|------------------|-----------------------|---------------------------|----------------------|
| 1 CENTAM | 302 | 554 | 312 | -78 | 1,090 |
| 2 China | 2,163 | 5,736 | 3,348 | -424 | 10,823 |
| 3 Egypt | -219 | -2,622 | 54 | 57 | -2,729 |
| 4 EU | 6,615 | 0 | -3,558 | 134 | 3,190 |
| 5 India | 1,127 | 1,075 | -289 | 11 | 1,924 |
| 6 Japan | 8,878 | 0 | 1,021 | -177 | 9,722 |
| 7 LDC | -190 | -166 | -187 | -41 | -584 |
| 8 MERCOSUR | 512 | 372 | 1,394 | -20 | 2,257 |
| 9 MEXICO | 47 | -343 | -714 | 72 | -938 |
| 10 ROW | 15,495 | 11,668 | -278 | 483 | 27,368 |
| 11 USA | -257 | 0 | -987 | -45 | -1,289 |
| 12 XME | 45 | 0 | -147 | 31 | -71 |
| Total | 34,518 | 16,273 | -31 | 2 | 50,762 |

(all values in millions of 2001 dollars)

Terms of Trade (ToT)

- In the Doha Round experiment, the most significant welfare cost to Egypt is ToT
 - Import prices rose more than export prices

- **Equation TOT2eq**

trade terms for region r, computed from components
(all,r,REG)

$$\text{tot2}(r) = c1_r(r) + c2_r(r) - c3_r(r):$$

Decomposition of Egypt's ToT in Experiments

| | Doha | Doha + Arab Spring |
|------------------------|--------------|--------------------|
| TempCoeff | | |
| 1 c1_r (world prices) | -0.02 | -0.02 |
| 2 c2_r (export prices) | -0.42 | 0.53 |
| 3 c3_r (import prices) | -0.14 | -0.06 |
| ToT | -0.59 | 0.46 |

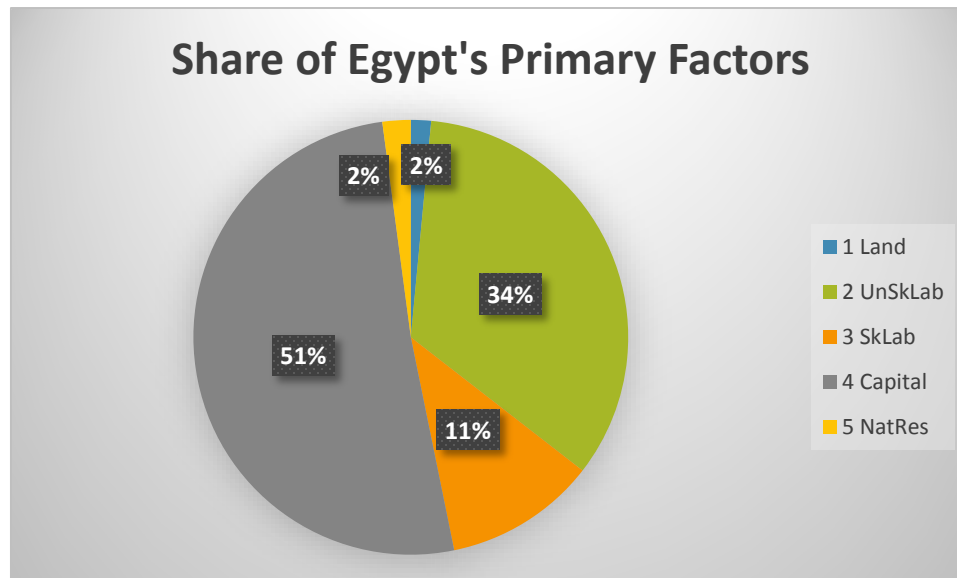
Change in Export Prices

- Change in Egypt's export prices driven by change in the price of factor endowment (i.e., Capital)

Equation PRIMFACTPR

computes % change in price index of primary factors, by region #
(all,r,REG)

$$VENDWREG(r) * pfactor(r) = \text{sum}(i, \text{ENDW_COMM}, \text{VOM}(i,r) * \text{pm}(i,r));$$



% change in market price

| | pm(i, Egypt) |
|-----------|---------------|
| 1 Land | -9.44 |
| 2 UnSkLab | 0.48 |
| 3 SkLab | 0.48 |
| 4 Capital | 2.07 |
| 5 NatRes | -6.2 |

Employment and Industry Outputs

Employment

| qo[*Egypt] | s4s9sub | arabsp2 | Difference |
|------------|---------|---------|------------|
| 2 UnSkLab | 0.28 | -3.32 | -3.6 |
| 3 SkLab | 0 | -3.44 | -3.44 |

| qo[*Egypt] | Doha | Doha + Arab Spring | Difference | |
|--------------|------|--------------------|------------|-------|
| 16 MacElct | | -0.04 | -5.63 | -5.59 |
| 18 Mtl | | 0.66 | -4.78 | -5.44 |
| 19 oMnfcs | | -2.39 | -7.69 | -5.3 |
| 25 Textile | | -1.79 | -7.05 | -5.26 |
| 9 Chemical | | -0.02 | -4.86 | -4.84 |
| 6 AppLeat | | -4.09 | -8.76 | -4.67 |
| 20 OSR | | 0.43 | -4.23 | -4.66 |
| 11 Elec | | 0.04 | -4.61 | -4.65 |
| 26 TrdFinsvc | | 0.06 | -4.55 | -4.61 |
| 27 Trncomsvc | | 0.73 | -3.87 | -4.6 |
| 30 Wdpap | | -0.14 | -4.39 | -4.25 |
| 14 Lmf | | 0.21 | -3.96 | -4.17 |
| 15 LVS | | 1.4 | -2.6 | -4 |
| 17 Min | | 0.17 | -3.78 | -3.95 |
| 7 cartrn | | -0.32 | -4.26 | -3.94 |
| 13 Fibers | | -0.07 | -3.95 | -3.88 |
| 22 pfbev | | 0.2 | -3.57 | -3.77 |
| 8 Cereal | | 0.94 | -2.6 | -3.54 |
| 31 Wheat | | 1.66 | -1.86 | -3.52 |
| 29 VegOilFat | | 0.48 | -3.03 | -3.51 |
| 21 OthAg | | 0.58 | -2.73 | -3.31 |
| 28 Vegftnt | | 0.61 | -2.39 | -3 |
| 10 Con | | -0.07 | -2.94 | -2.87 |
| 24 Rice_Pro | | 0.01 | -2.77 | -2.78 |
| 23 Rice_Pad | | 1.12 | -1.49 | -2.61 |
| 32 CGDS | | -0.11 | -2.68 | -2.57 |
| 12 Energy | | 0.11 | -2.44 | -2.55 |

Learning Experience!

Originally tried to run the experiment for sector wide capital reduction AND **capital outflow specifically from Textile and Construction to Energy sector**

Problems:

Qfe (sector specific endowment) could not be shocked in the condensed model.

Uncondensed model would not run with the given license

When it finally ran- there was bad data problem

SWITCH GEAR IF THE HARDEST PATH DOES'T WORK OUT

Group 4: Updating the database

Jeff Okun-Kozlowicki

Gregory Whitten

Methodology – update the data

- Incorporate shocks to:
 - GDP;
 - Capital stock;
 - Labor force;
 - Population

to target 2015 levels (as indicated by World Bank's WDI).

- Use PWT results as a substitute for selected countries.
- Endogenize a_f in the closure to match observed GDP growth.

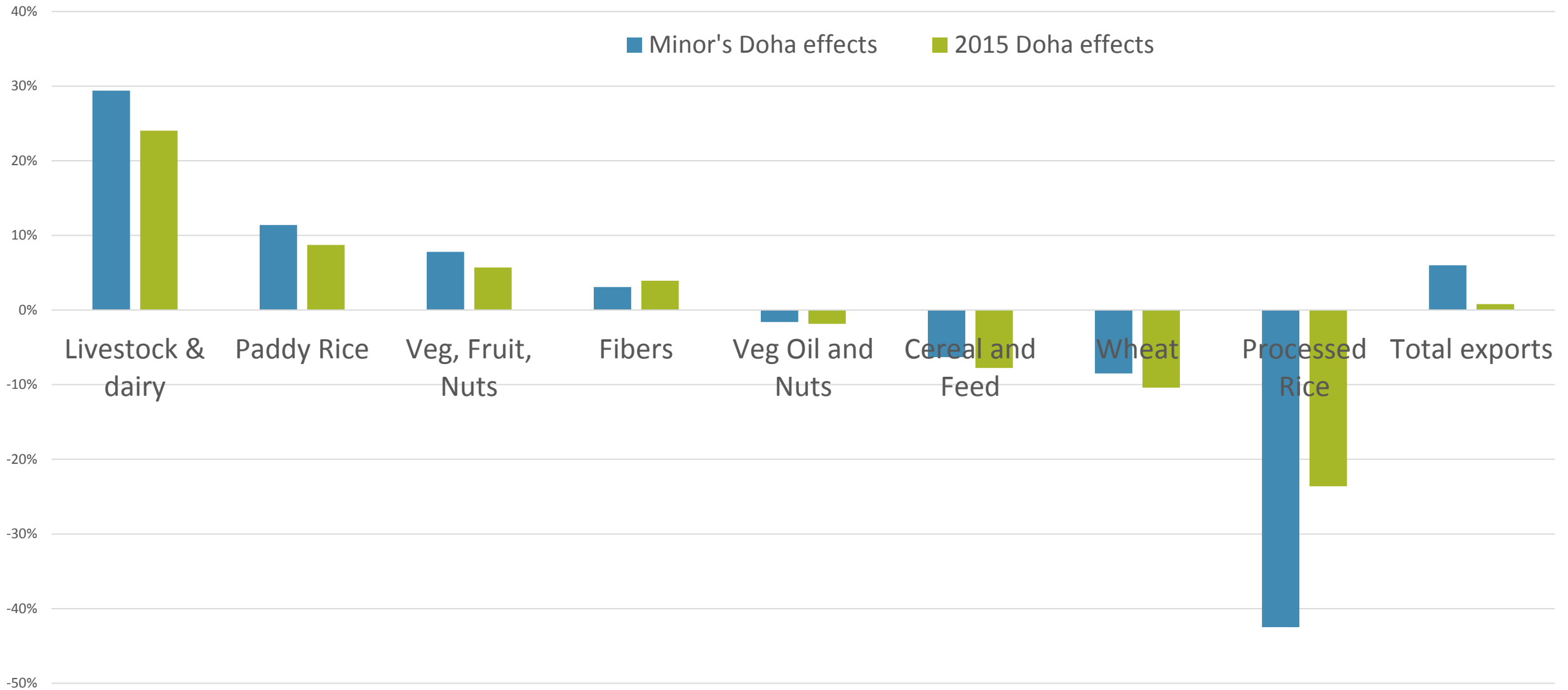
Methodology – update the data: closure

- Minor (2006) fixes the trade balance and endogenizes the price of saving (\bar{d}_{psave}).
- We choose to change the endogenize the trade balance.
- Capital stocks have generally grown over time.
- For open economies, FDI may be an important contributor to domestic K.
- For intellectual consistency with shocking capital, we fix \bar{d}_{psave} .
- Unlike Minor (2006), we make labor exogenous in order to update the data to 2015.

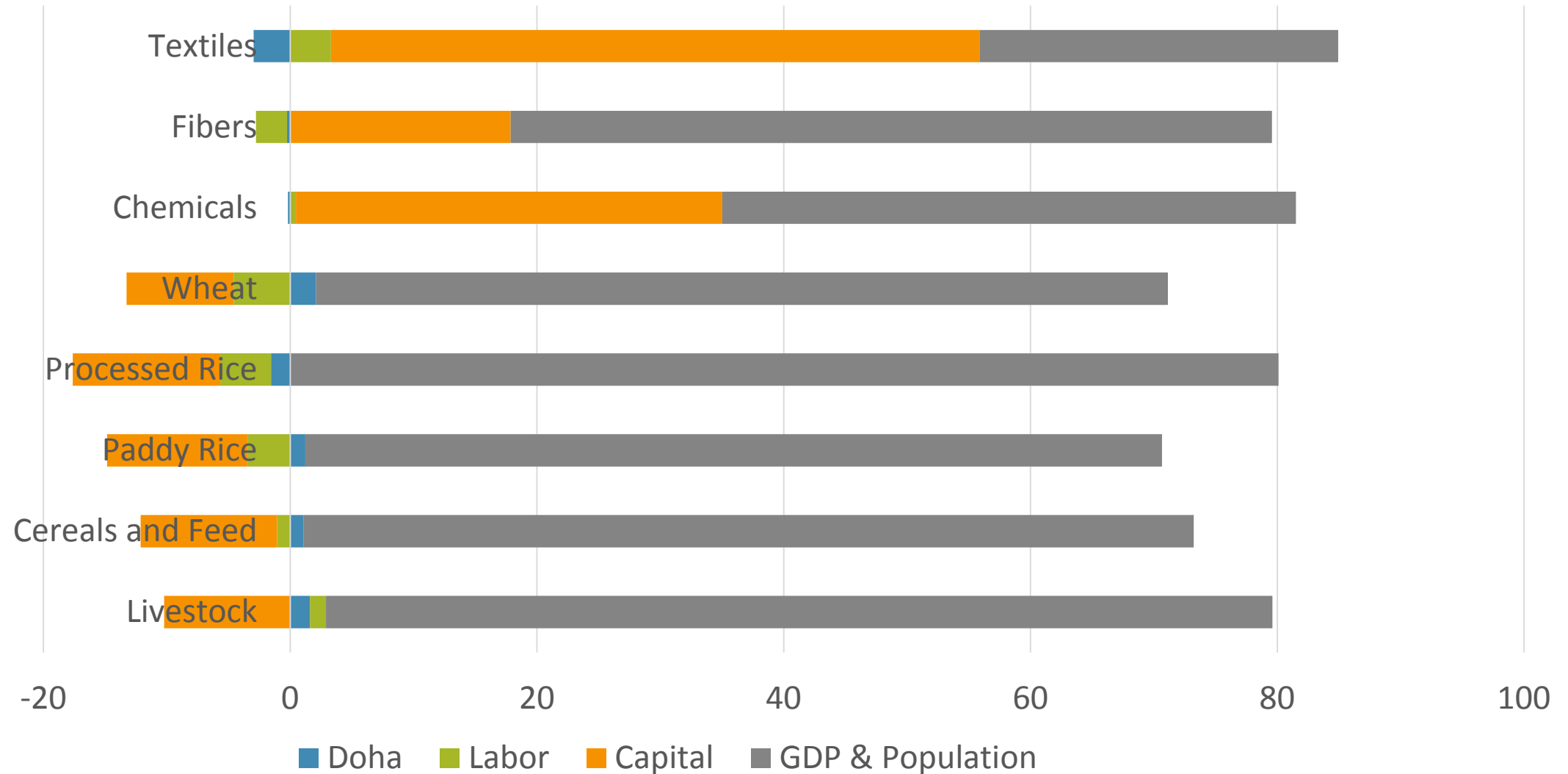
Change in EV owing to Doha as a share of post-Doha GDP.

| | |
|------------|--------|
| 1 CENTAM | 0.47% |
| 2 China | 0.12% |
| 3 Egypt | -0.29% |
| 4 EU | -0.04% |
| 5 India | -0.11% |
| 6 Japan | -0.03% |
| 7 LDC | -0.21% |
| 8 MERCOSUR | 0.24% |
| 9 MEXICO | -0.11% |
| 10 ROW | 0.03% |
| 11 USA | 0.01% |
| 12 XME | -0.09% |

Sectors of Doha's effects in Egypt



Contribution to growth in Egyptian disaggregated output



Contributors to differences between the simulations in Doha's effects

- Terms of Trade for CENTAM (smaller worsening under Doha)
 - Wheat: export prices rise more.
 - Textiles: export prices rise more.
 - Processed rice: import prices fall more.
- Terms of Trade for Mercosur (improvement under Doha)
 - Livestock & dairy: import prices fall more.
 - Processed food & beverage: export prices rise more.
- Allocative efficiency for Japan (better under Doha: `prodtax`)
 - Construction output rises.
 - Trade in Financial Services rises.

TFP %age Changes

| afereg | Implied by the model (2001-2015) | Greg's work (2001-2010) following Caselli (2005) |
|------------|----------------------------------|---|
| 1 CENTAM | 22.267 | |
| 2 China | 82.3 | 37 |
| 3 Egypt | 8.075 | -1 |
| 4 EU | 8.954 | |
| 5 India | 71.743 | 18 |
| 6 Japan | 17.443 | 1 |
| 7 LDC | 21.967 | |
| 8 MERCOSUR | 10.161 | |
| 9 MEXICO | -5.178 | -9 |
| 10 ROW | 8.462 | |
| 11 USA | 14.139 | -8 |
| 12 XME | 10.329 | |

Limitations

- Capital stocks are not PPP-adjusted.
- Problems with simulation-implied TFP.
- We assume equal growth rates for skilled and unskilled labor (data limitations).
- Fitting a 15-year update into a comparative static framework is problematic.
- No reduction in our experiment of service barriers.