

Food Implications of US Biofuels Mandate

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and

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Outline

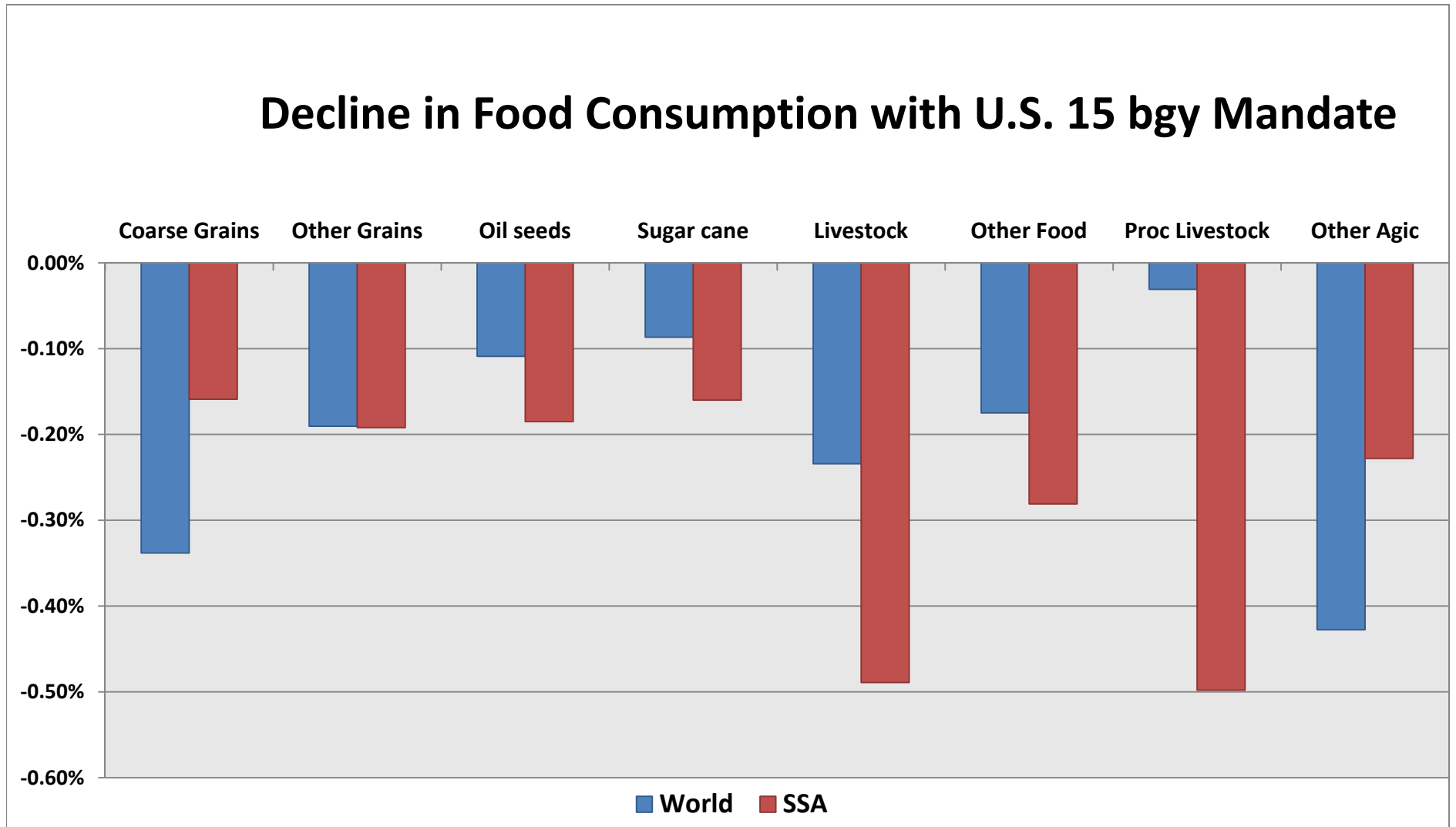
- Research Question
- Empirical Model
- Findings
- Conclusions

Research Question

- Hertel et al (2010):
 - Penetration of Biofuels from 1.75 bgy to 15 bgy
 - Intensification of Agricultural Production
 - Yield Intensification
 - Expansion of Land Use for Cropping
 - Land moves to Crops from Forestry, Livestock
 - Reduction of Food Consumption
 - More Grain to Ethanol Production → Higher Grain Price
→ Higher Cost to Food Production → Reduction in
Food Demand → Nutritional Effects in Less Developed
Countries

Research Question

Decline in Food Consumption with U.S. 15 bgy Mandate



Research Question

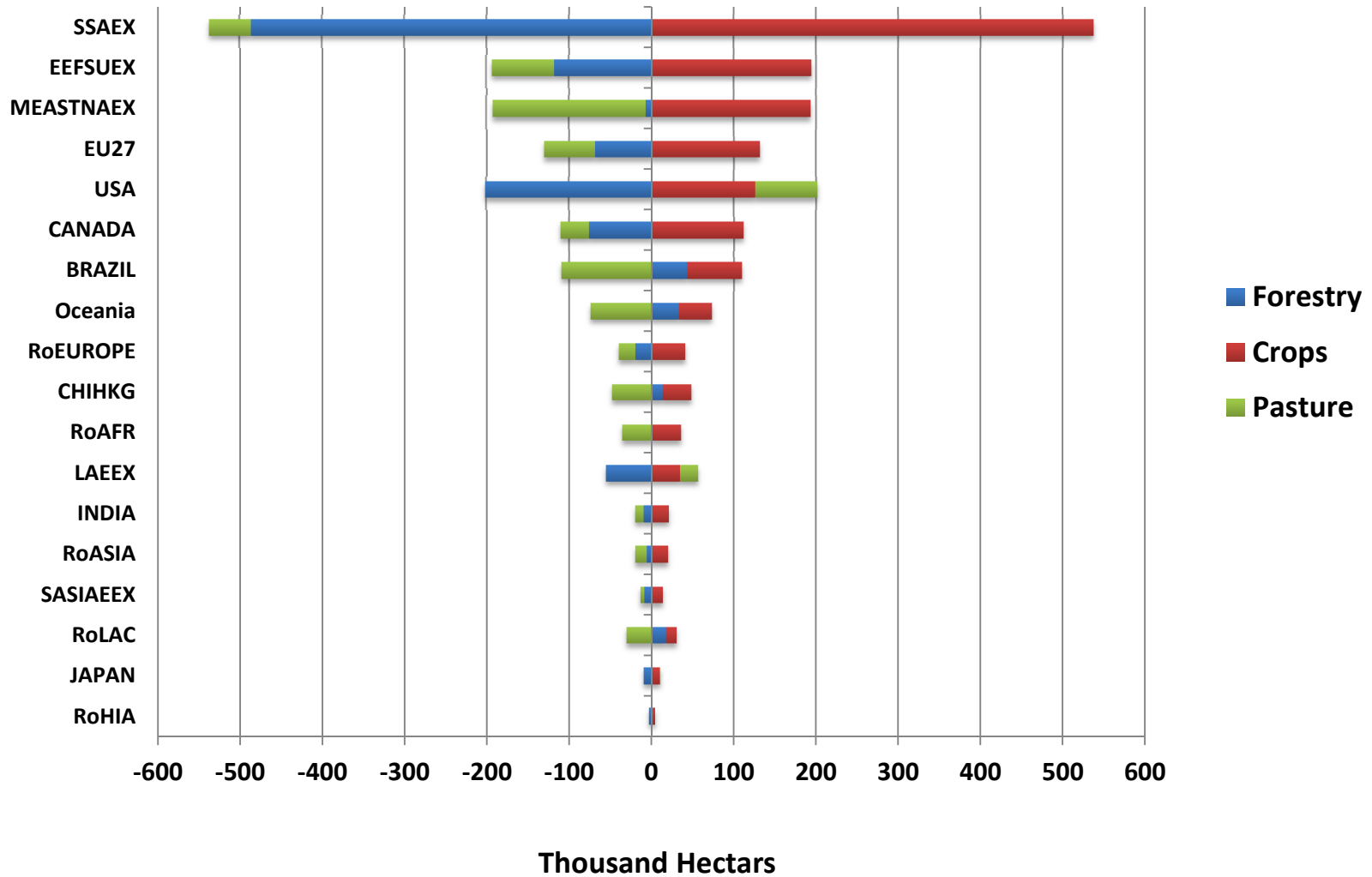
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 - Penetration of Biofuels from 1.75 bgy to 15 bgy
 - Intensification of Agricultural Production
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 - Expansion of Land Use for Cropping
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 - More Grain to Ethanol Production → Higher Grain Price → Higher Cost to Food Production → Reduction in Food Demand → Nutritional Effects in Less Developed Countries
- **What are the Implications for Food Consumption?**

Empirical Model

- GTAP-BIO model (Hertel et al 2010)
 - Version: Base Year 2001
 - Closure:
 - `swap qo("ethanol1","USA") = tpd("ethanol1","USA");`
 - `swap del_taxrpcbio("USA") = tpbio("USA");`
 - `swap qp("CrGrains", REG) = tpcons("CrGrains", REG);`
 - ...
 - `swap qp("OthFoodPdts", REG) = tpcons("OthFoodPdts", REG);`
 - Shock
 - `shock qo("ethanol1","USA") = 757.28;`
 - Default parameter file; Gragg 2-4-6 solution method

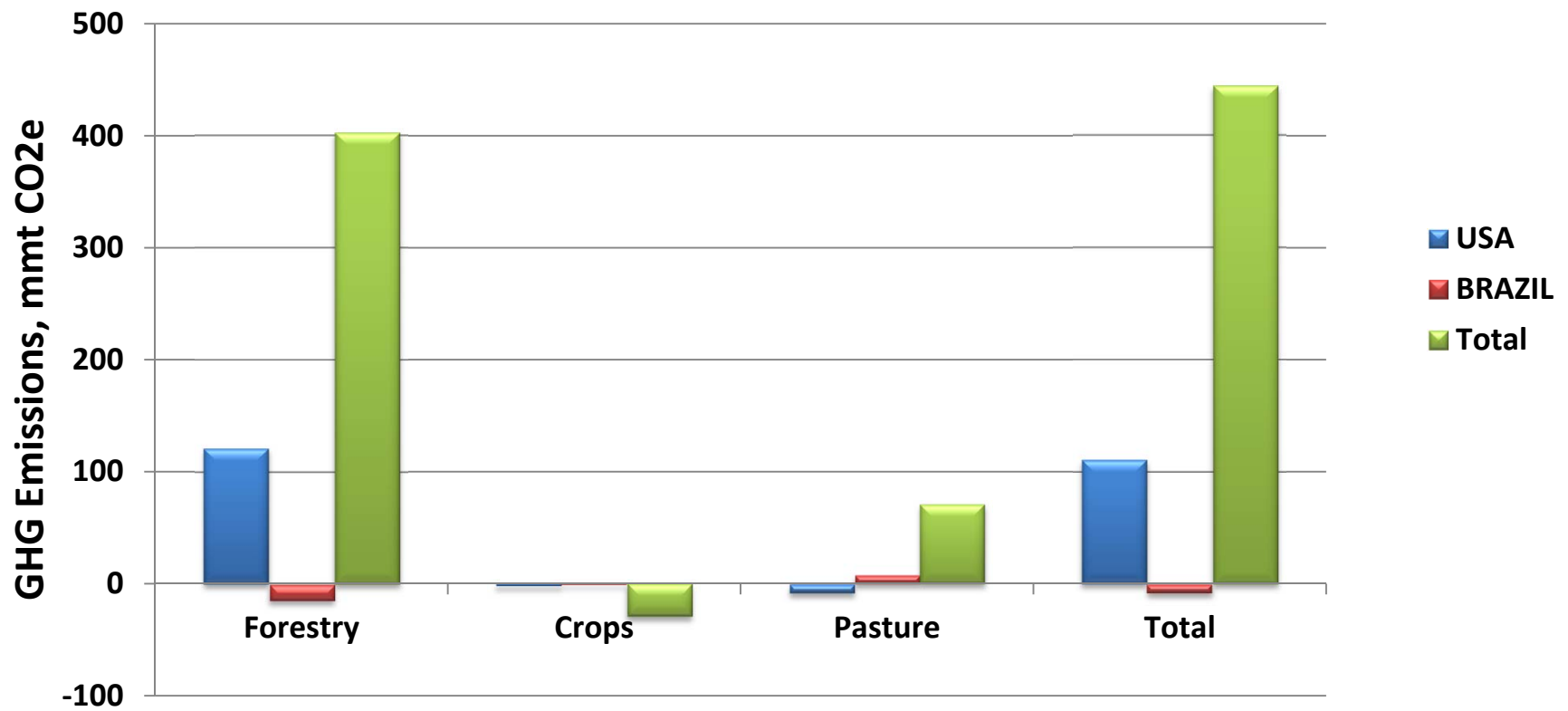
Findings

"Difference-in-Differences" Land Use Decomposition by Region



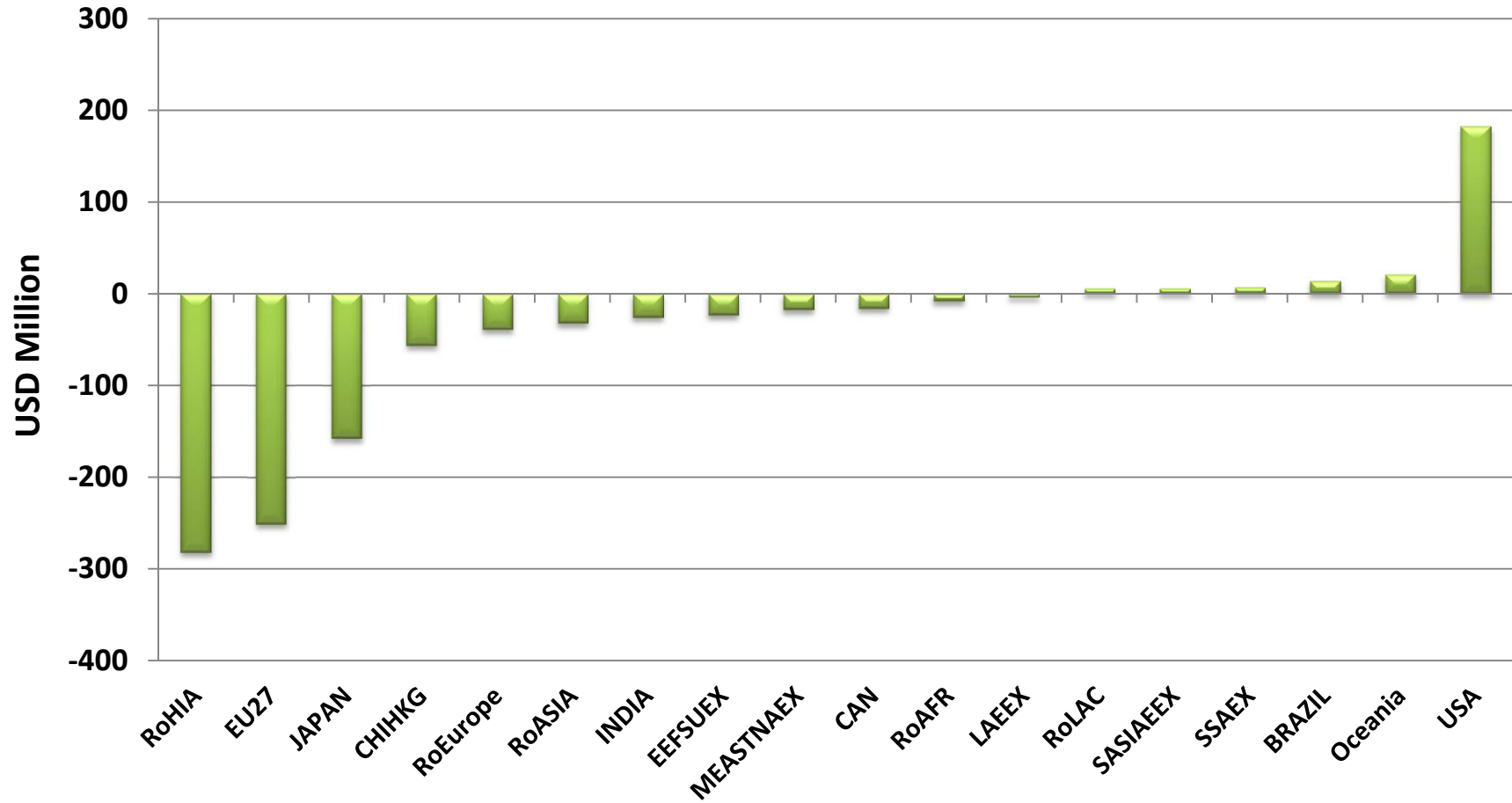
Findings

"Difference-in-Differences" Decomposition of GHG Emissions



Findings

"Difference-in-Differences" Welfare Change by Region



Conclusions

- Food Implications due to U.S. Ethanol Mandate
 - Increased Crop Area through “Fixing” Demand for Food ...
 - Reduction in Forests, Pasture Land ...
 - (Smaller Effect in Brazil for Forests)
 - Leads in Increased GHG Emissions
 - (Larger GHG Emissions from Forest Conversion)
 - Overall Welfare Effect is Negative ...
 - Except for the US (possibly) due to Reduced Tax Distortions