

Global ASM-Modeling Capability

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As a result of an ongoing Ph.D. dissertation supervised by myself and executed by Chi-Chung Chen a new modeling capability has arisen for an enhanced international component in agricultural sector analysis. In particular, past analyses had one of the following sets of characteristics.

1. A detailed multi-country model was created which had a detailed depiction of world trade. These efforts are generally limited to a single commodity. They also have a rather simplistic model of any one country. (Spatial equilibrium or Armington type studies)
2. A detailed US transportation model linked to the rest of the world with a spatial equilibrium structure. These models typically do not model supply response and are single or just a couple of commodities.
3. A detailed multiproduct US model with a lot of supply response but with aggregate representatives of trade with the rest of the world. In particular, having an excess demand curve from the rest of the world without detail on where commodities move.

My ASM model falls into the third class.

Referencing ASM above its structure it did not allow us to examine the effects of bilateral agreements; shifts in demand or supply conditions in particular countries; or shifts in trade policies in particular

countries to see how that might affect activity within the US trade within the rest of the world.

A new model has been developed which we call Global ASM to help alleviate this problem. This model is based on unification of traditional spatial equilibrium models as pioneered by Takayama and Judge (type 1 above) and the price endogenous sector models as discussed in McCarl and Spreen (type 3 above) with some of the US regional transport breakdown from type 2 above. In this framework we have developed an extension of the ASM in which a subset of the ASM commodities are much more explicitly represented in world trade. In doing this we utilized the data developed in trade model studies by Dr. Steven Fuller who in turn used elasticity data based on the SWOPSIM model by Ronnegin at USDA. This capability has been incorporated into Global ASM. That model depicts production, consumption, processing, export and import of all the traditional ASM commodities (Table 1 and Table 2) with enhanced treatment of trade for seven of the commodities. In particular we depict trade in a world as broken into the regions in figure 1 or as listed in Table 3. The commodities that are subject to this enhanced trade treatment are hard red winter wheat, hard red spring wheat, soft white wheat, durum wheat, corn, sorghum, and soybeans.

In setting up this model several modifications were also made within the existing ASM in particular production and consumption of four wheats are now modeled rather than one. The ASM supply from its 63 US regions was collected into ten market consumption regions corresponding to the USDA ten regions as outlined in figure 2. In turn, outgoing trade and incoming trade with rest of the world regions were modeled based on the US exporting from a weighted average as of ports in each of these ten US regions using weighted average transportation cost from the region between the US and

foreign regions based on the more detailed data by Fuller.

I believe that the development of Global ASM is significant because it will allow us to examine things that affect other countries and then trace back in a rather detailed fashion what goes on in the US. I also hope to extend the model to cover trade in other important commodities over time.

Finally note a stochastic version of the model also exists which contains 17 years of US yield events estimated following work done in a dissertation done by Thysen and a paper by Lambert et al. This can be used to do Stochastic sector analysis. This framework has also been used with a simplified three state of nature representation to appraise the effects of ENSO/El Nino forecasting.

Table 1. Primary Commodities

<u>Crop Commodities</u>	<u>Units</u>	<u>Livestock Commodities</u>	<u>Units</u>
Cotton	Bales	Cull Dairy Cows	Head
Corn*	Bushel	Cull Dairy Calves	Head
Soybean*	Bushel	Cull Beef Cows	Cwt, LW
Hard Red Spring Wheat*	Bushel	Calves	Cwt, LW
Hard Red Winter Wheat*	Bushel	Yearlings	Cwt, LW
Soft White Wheat*	Bushel	Non-Fed Beef	Cwt, LW
Durum Wheat*	Bushel	Fed Beef	Cwt, LW
Sorghum*	Bushel	Veal Calves	Cwt, LW
Rice	Cwt	Cull Sows	Cwt, LW
Barley	Bushel	Hogs	Cwt, LW
Oats	Bushel	Feeder Pigs	Cwt, LW
Silage	Ton	Poultry	GCAU
Hay	Ton	Cull Ewes	Cwt, LW
Sugar Cane	1000 lbs	Wool	Cwt
Sugar Beets	1000 lbs	Feeder Lambs	Cwt, LW
Potatoes	Cwt	Slaughter Lambs	Cwt, LW
Fresh Tomatoes	25 lb. boxes	Unshorn Lambs	Cwt, LW
Processed Tomatoes	Tons	Wool Subsidy	\$
Fresh Oranges	90 lb. boxes	Other Livestock	GCAU
Processed Oranges	Tons	Turkeys	Cwt, LW
Fresh Grapefruits	85 lb. boxes	Eggs	Thous. dozen
Processed Grapefruits	85 lb. boxes		
Milk	Cwt		

Note: LW indicates live weight
GCAU is grain consuming animal
unit in raw sugar equivalent
*indicates trade is modeled in an enhanced way in Global ASM

Table 2. Secondary Commodities

<u>Crop Commodities</u>	<u>Units</u>	<u>Livestock Commodities</u>	<u>Units</u>	<u>Feed Commodities</u>	<u>Units</u>
Soybean Meal	Cwt	Fluid Milk	Cwt	Feed Grains	1000 lbs
Soybean Oil	1000 lbs	Skim Milk	lb	Dairy Protein Feed	1000 lbs
Refined Sugar	1000 lbs	Non Fat Dry Milk	lb	High Protein Swine Fd	1000 lbs
Corn Starch	1000 lbs	Cream	lb	Low Protein Swine Fd	1000 lbs
Corn Gluten Feed	1000 lbs	Butter	lb	Low Protein Cattle Fd	1000 lbs
Corn Oil	1000 lbs	Ice Cream	lb	High Protein Cattle Fd	1000 lbs
Ethanol	1000 lbs	American Cheese	lb		
HFCS	1000 lbs	Other Cheese	lb		
Dextrose	1000 lbs	Cottage Cheese	lb		
Confectioneries	1000 lbs	Fed Beef	Cwt, CW		
Beverages	1000 lbs	Non Fed Beef	Cwt, CW		
Baked Goods	1000 lbs	Veal	Cwt, CW		
Canned Goods	1000 lbs	Pork	Cwt, CW		
Dried Potatoes	Cwt				
Chipped Potatoes	Cwt				
Frozen Potatoes	Cwt				

Note: Cw means carcas weight

Table 3: The Definition of Trade Regions in Global ASM

Name	Regions	Country
1	WEST AFRICA	Angola, Cameroon, Liberia, Nigeria, Zaire...
2	NORTH AFRICA	Algeria, Libya, Morocco, Tunisia.
3	EAST AFRICA	Malawi, Uganda, Zambia, Rwanda, South Africa....
4	EASTMEDITERRANE	Egypt, Israel, Lebanon, Syria.
5	RED SEA	Ethiopia, Somalia, Sudan, Yemen.
6	WEST ASIA	Afghanistan, Bangladesh, Nepal, Pakistan, India.
7	PERSIAN GULF	Iran, Iraq, Kuwait, Saudi Arabia...
8	ADRIATIC	Cyprus, Greece, Turkey.
9	CHINA	China
10	SOUTHEAST ASIA	Hong Kong, New Zealand, Philippines, Thailand...
11	JAPAN	Japan
12	SOUTH KOREA	South Korea
13	TAIWAN	Taiwan
14	EAST AMERICA	Belize, Costa Rica, Honduras, Panama, Venezuela...
15	CARRIBEAN	Bahamas, Barbados, Haiti, Jamaica...
16	AUSTRALIA	Australia
17	N. CENTRAL EUROPE	Austria, Belgium, Germany, Netherlands, Switzerland.
18	EAST BLOCK EUROPE	Bulgaria, Czechoslovak, Hungary, Poland, Romania...
19	WESTERN EUROPE	Ireland, Malta, Portugal, Spain, Gibraltar...
20	ISLANDS	Iceland, Ireland, U.K.
21	SCANDINAVIA	Denmark, Finland, Norway, Sweden.
22	CANADA	Canada
23	EAST MEXICO	Mexico
24	UNITED STATES	United States
25	USSR	USSR
26	WEST AMERICA	Bolivia, Chile, Colombia, Ecuador, Peru.
27	BRAZIL	Brazil
28	ARGENTINA	Argentina



Figur

Map of Global Regions

e 1.

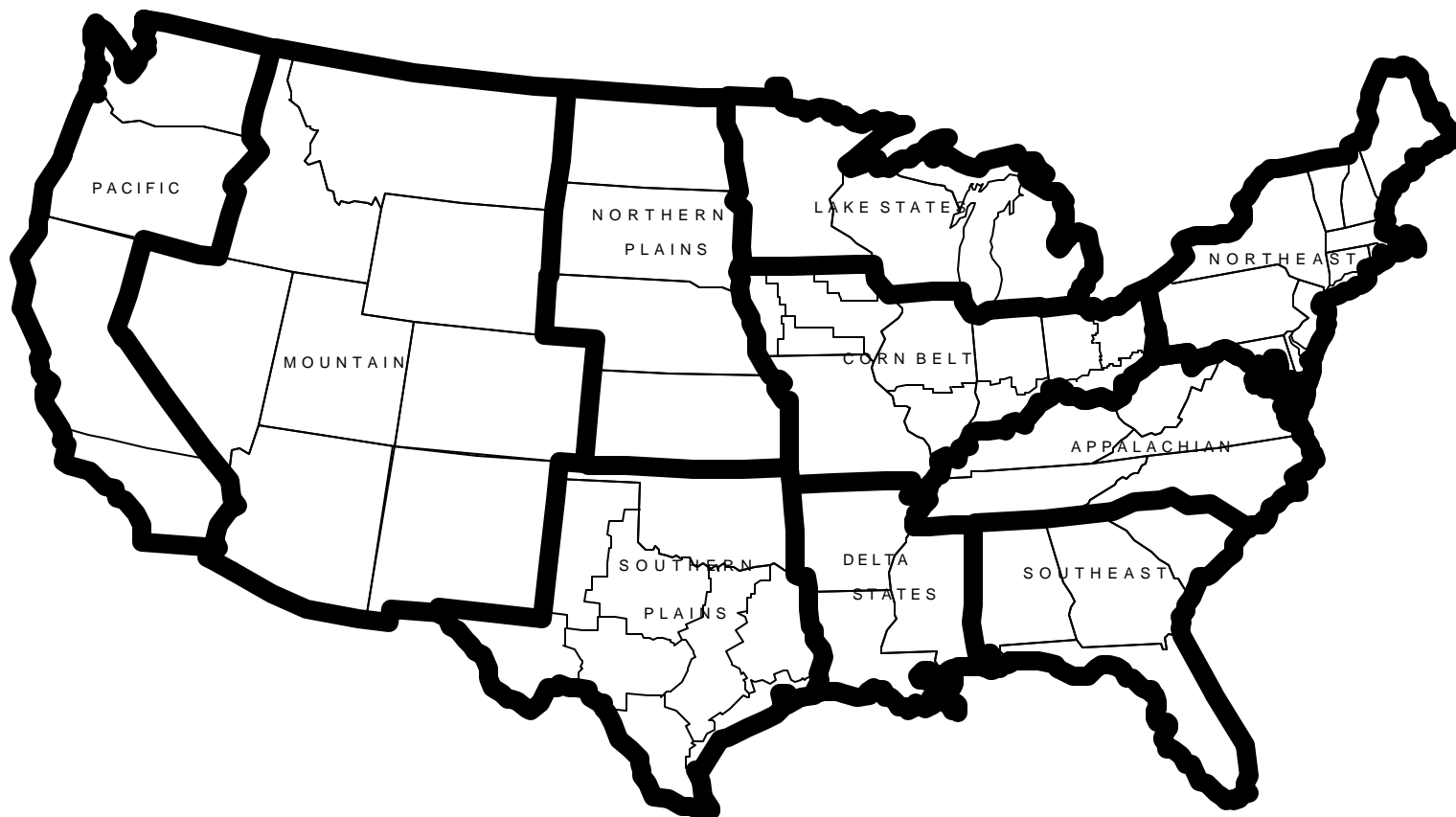


Figure 2. Map of Regions in ASM