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ABARE'S VIEW ON AGLINK-COSIMO

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Contact person: Loek Boonekamp (e-mail: loek.boonekamp@oecd.org)

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The purpose of the meeting is to discuss how to improve the AGLINK-COSIMO model. ABARE has various general points/ suggestions to make about directions for this work.

1. It is suggested that the model could be cleanly rewritten in GAMS as an MCP (Mixed Complementarity Problem) and solved in one hit. The GAMS notation is economical. It reads like algebra and documentation is easy. Special cases are readily catered for through the use of subsets and conditional control statements. The MCP form allows use of endogenous policy switches, a variable can move from 0 to a value and back. It is easy to make the structure modular by making price exogenous.

2. The model algebra could be well documented as per the IMPACT model.

3. PEATSIM is an example of a model written in MCP form. However, it is inadequately documented, particularly in relation to the more complex policy wedges. It is advised that an economist rather than a computer programmer does the required coding work to aid intuition and transparency. Modeling real world policy rules is very important. Care is particularly required to model policies that would be decoupled under conditions of certainty but not uncertainty.

4. GTAP in GEMPACK or in GAMS are examples of how large models can be compactly written. GEMPACK currently has the deficiency that it does not handle MCP problems well when they are large scale. While most things can be done in TROLL, the cost benefit ratio is probably poor relative to GAMS. Most “ag” modelers use GAMS and this alone hints that GAMS could be used from now.

5. Bilateral trade is important. It could be best to model trade in homogeneous product. In the simplest case, the import price should differ from the export price by no more than twice the shipping cost. Disaggregation of commodities would be necessary to find the homogeneous good; to, for example, find the different meat part where two way trade appears to occur. If products really are imperfect substitutes this could be modeled as directly and flexibly as possible with cross price elasticities rather than an Armington substitution structure where possible. In sum, some product trade could be treated as trade in homogeneous product, while other product trade could be treated as trade in heterogeneous product.

6. The model could be reconciled with theory by making clear what the underlying optimization problem is from which the equations originate. David Abler’s examples from PEATSIM of various agricultural industries are helpful here. He approximates relationships using an elasticity form. However, in various cases it could be possible to stick to the original form.

7. Livestock dynamics. It is argued that in a world of climate change concerns, it is critical to have a realistic but necessarily economical modeling of herd/ flock dynamics. This could generate cycles even in a forward looking model.
8. Real world land constraints. Rather than modeling cross price elasticities between land using activities, a case may be made to introduce land classes and allow competition for land within a class with land premia between classes depending on special crop needs. Learning what EUFASOM has to offer in terms of long term agri-forestry modeling is advised. It may be possible to develop an interface with this model, which again is already coded in GAMS.

9. It is also advised to allow forward looking adjustment in livestock numbers in response to future profit options. The AGLINK-COSIMO model solves in one hit and this feature is important to do this. How much to invest in trees, and in the carbon in soil are all important questions that determine the adjustment path under climate change policy and in securing global food security. It is argued that these questions are best answered in a model which looks to the future in determining current actions. Due account also needs to be given to the fact that some behaviour appears to be myopic.

10. Adapting to an uncertain future is an important feature of agricultural farm management. In other words, the impact of uncertainty on agricultural supply response may be an important feature to incorporate in future modeling. In particular, the model could be extended to consider states of nature/contingency analysis in a straightforward way as in Manne and Richel’s “Buying Greenhouse Insurance”. This could be particularly important in developing agricultural crop and livestock diversification policies to minimize climate change damage risks.

11. On model calibration and validation. The cleanest approach to calibration is to introduce a set of supply and demand shifters and calibrate these to fit the reference case scenario of the model. In this case the model is calibrated to paths for all the normally endogenous variables. In effect exogenous variables are made endogenous for the reference case and then this is reversed in policy simulation. It is thought that a similar approach is followed in AGLINK. On model validation, the same thing may be done as for the reference case. Except rather than for the future, the projections are over the known past. The issue then for consideration is just how reasonable are the resulting demand and supply shifters.

12. Use of dynamic duality theory could be appropriate to obtain parameter estimates for the expected profitability of agricultural enterprises. Other than that, some type of bounded systematic sensitivity analysis as per GEMPACK could be undertaken to find which parameters are really important and then econometric work could be done to hone estimates.