This brief series was developed in preparation for the Foresight Breakout Session of the Global Conference on Agricultural Research for Development (GCARD 2012) and the Global Foresight Hub. The briefs were written to communicate to a wider audience, such as policy makers, civil society organizations, researchers, and funders. The briefs were classified into three categories: Future Studies, Regional Update, and Visioning.

A Quarter Century of Forward-Looking Policy Analysis

Wyatt Thompson

The Food and Agricultural Policy Research Institute at the University of Missouri (FAPRI-MU) has been providing decision makers with economic analysis for more than 25 years. The forward-looking analysis estimates how a policy could change markets for crops, livestock and their products, including biofuels. It also measures policy impacts on land use, farm income, consumer costs, and taxpayer expenditures.

Researchers at FAPRI-MU use economic models with equations representing how people respond to prices and policies, as well as other factors. We developed these models over decades, continually updating them as more data about markets become available, to reflect sudden market changes, or to take the latest policy mechanisms into account. Updates are necessary in order for models to remain valid for forward-looking analysis. If decision makers consider changing a policy, the policy can be changed in the model, and the model results estimate how this option would affect producers, consumers, taxpayers, and others. Research focuses mostly on the United States.

The implications of policy change – some examples

- U.S. Senate Committee on Agriculture, Nutrition and Forestry approved the “Agriculture Reform, Food and Jobs Act of 2012” on 26 April 2012, and FAPRI-MU estimated how key provisions would affect agricultural markets. The report discusses several potential impacts on crop markets and taxpayer costs, as well as on livestock markets and food consumers. The findings show how a policy change that reduces taxpayer costs on agricultural support can also lead to higher crop output.

- Before U.S. biofuel blender tax credits and the specific tariff on ethanol imports were allowed to expire, FAPRI-MU provided an analysis of the market impacts of this decision. One of the results of FAPRI-MU research was to show how the effects depend on market context. For example, the biofuel use mandates set a minimum level of use that determines the volumes in the market, so policy impacts might be different depending on whether the mandate forces people to increase biofuel use or whether people voluntarily use more biofuel than mandated. If the petroleum price is low and people would tend not to use much biofuel, if not for the mandate, reducing blenders credits in this context might not change the amount of biofuel used. However, if the petroleum price is very high, then biofuel mandates that require a minimum level of use might be exceeded, so removing the tax credits is likely to affect the amount used.


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See the FAPRI-MU website (http://www.fapri.missouri.edu/) for the reports about methods and results of the latest analysis.


Arriving at the scenarios

FAPRI-MU consists of researchers based at a university who answer questions posed by decision makers in the U.S. legislative and executive branches, business groups and others. We collaborate with researchers in other universities and government agencies on specific projects, providing additional measures of policy effects that can relate to farm-level, international or environmental impacts.

We use baseline-to-scenario comparisons. A preliminary baseline is developed by updating data and equations, then solving the models for a given set of assumptions. Experts in public and private service critique the first draft of the baseline for the plausibility of assumptions and results. After revisions are made based on this validation process, we publish a baseline set of projections. The baseline highlights some of the stresses in agricultural markets, but it is not a forecast of markets because the underlying assumptions are intended to be plausible and a good basis for analysis, but not predictions.

For policies, baseline projections rest on the assumption that policy continues as stated or planned. To analyse a proposal to change one or more of these policies, FAPRI-MU researchers change the assumption and then solve the model with that change in place. The resulting market prices and quantities, farm income and other indicators show how markets would evolve under this alternative assumption. The difference in market outcomes between the baseline and the scenario with alternative assumptions estimates the direction and size of the impact of the policy.

The economic models are not solved one time for one set of assumptions. Instead, the models are solved many hundreds of times, with each simulation based on a particular set of initial conditions, including weather effects on crop yields, demand shocks and variations in petroleum and other energy prices. Simulations reflect some of the range of possible results based on variations in a subset of the full range of possible variations in market conditions. We do not vary policy assumptions. Instead, the researchers keep the same assumptions about key agricultural, biofuel and other policies common for all simulations. To conduct a policy scenario, the related policy assumptions are changed and the model is solved again with this one difference. Comparing all of the output from the scenario to all of the output of the baseline provides an estimate of the policy impacts in hundreds of contexts.

From baseline to scenario – some examples

- FAPRI-MU presented the baseline briefing book to Congressional staff, executive branch officials and industry experts in Washington D.C., in March 2012. The briefing book summarized simulation output by showing average crop and livestock product prices, quantities, biofuel market indicators, consumer and taxpayer costs, and farm income projections over the following ten years. The briefing book ends with distributions for the soybean price and crop insurance net taxpayer costs to demonstrate the range of uncertainty based on some variations in market conditions.

- In May 2012, we released the biofuel baseline briefing book based on the same process. In that report, we ran scenarios with alternative assumptions about the volume of ethanol mixed with gasoline for use in normal cars, specifically the share of E15. These assumptions affect overall ethanol demand, so they interact with mandates that set minimum levels of biofuel use. The scenario results showed how more of this use of ethanol can lead to more ethanol use than is mandated, leading to higher corn price and more corn area than in the baseline. Less use of ethanol in this form might not have much of an impact on corn markets relative to the baseline. In those cases, total ethanol use is largely driven by the mandate to begin with, so assuming less of one ethanol use requires more ethanol in other fuels rather than causing a reduction below the mandated volume.

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How results are used and valued

Decision makers have certain goals in mind when they consider policy options. As they choose which policies to support and which to oppose, useful information would include the extent to which each option works towards or against the policy goals. Unintended effects can also be important to decision makers. For example, options intended to target producers' income might affect conservation. Biofuel policy options might affect consumer costs for food and fuel. FAPRI-MU is one source for determining such effects.

The usefulness of the results for decision making is demonstrated when popular and specialized press outlets report study results, executive branch officials or industry groups ask for research, or legislators or their staff request that an analysis be conducted of specific policy options that are being considered. Funding drawn from these same groups, particularly from Congress and the U.S. Department of Agriculture for most of the last 25 years, also suggests that the work is considered valuable. Developing models that can be used to answer questions on short notice is an investment in research capacity, but it depreciates quickly as markets and policies change, so continuing core funding is necessary.

Another indication of impact is that the method of analysis initiated in the mid-1990s – using many model simulations to represent ranges of market conditions – has become more widely accepted and even expected. Congressional staff and executive branch officials who work with the details of various agricultural policies understand that analysis provides more robust results that can be relevant under a range of market conditions. This method is used at other organizations that provide forward-looking analysis, such as the Congressional Budget Office, which estimates taxpayer costs of policies, or “scores” them, and by the Organization for Economic Cooperation and Development and the European Commission.

Maintaining relevance

Some of the lessons that FAPRI-MU staff have learned during their 25 years of providing information to decision makers are as follows.

*Provide timely and accessible information to decision makers.*

The institutions and actors involved in the process set the timeline for policy decisions. Researchers who work to support decision making must deliver results when they can be used. Analysis will not change a decision that has already been made. Decision support is delivered to decision makers in a format that is accessible, with key results and key limitations highlighted. For major reports, FAPRI-MU staff travel to present results directly, if useful.

*Establish the starting point, or “business as usual” case.*

Decision makers choose policies to affect the future, so FAPRI-MU researchers developed a baseline process that provides a tested starting point for forward-looking analysis. Comparing simulations over the projection period estimates policy effects over that period. FAPRI-MU researchers use historical data to validate the economic models, where possible, but analysis set in a historical period may or may not relate to future conditions.

*Provide information that is neutral or objective.*

FAPRI-MU decision support provides information, not judgments, to decision makers. Our role is strictly scientific: our task is to provide timely economic analysis of how various policy options affect markets and related outcomes. Judging an outcome as good or bad is not our task or within our competence. Moreover, our research is never all-inclusive because FAPRI-MU focuses on the economic and market impacts. It is up to the decision makers to take on the challenge of weighing the estimated impacts and taking into account all the other information necessary to determine which policy options are better than others.