Agriculture and the GATT: The Link to U.S. Farm Policy

By Mark Drabenstott, Alan Barkema, and David Henneberry

This article is the second in a two-part series by the authors focusing on the critical relationship between the General Agreement on Tariffs and Trade (GATT) and U.S. farm policy. The first article, "Agriculture and the GATT: A Time for Change," appeared in the February issue of *Economic Review* and discussed the importance of agriculture in the Uruguay Round of GATT negotiations.

A decade of economic upheaval in U.S. and world agriculture has forced policymakers around the world to consider new rules on international agricultural trade. The Uruguay Round of the General Agreement on Tariffs and Trade (GATT), which began in 1986 and is to end in 1990, is committed to cutting the heavy costs of farm subsidies and to ending the trade distortions these subsidies create. The current U.S. farm bill, the Food Security Act of 1985, also expires in 1990. The timely intersection of U.S. farm policy review and a possible new GATT accord on agriculture may lead to U.S. farm policy that, for the first time, will be dramatically affected by an international agreement.

A new GATT accord would change U.S. farm policy in two ways. First, it would necessitate the overhaul of farm commodity programs, the principal instrument of U.S. agricultural policy. The change would be necessary to reduce the trade-distorting effects of these programs. Second, an abrupt change in farm programs may lead many observers to question the validity of current farm policy goals. Many policymakers are already questioning whether current goals, rooted in the 1930s, may be off the mark.

This article examines the effects a GATT agreement to liberalize agricultural trade may have on U.S. farm policy. Although a new GATT accord could allow continued support of farm incomes, the article concludes that strik-

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ingly new methods of supporting farm incomes would be required. The new programs may significantly affect farm incomes, farm asset values, and agribusinesses. The first section shows why U.S. farm policy goals need to be reestablished in light of a potential GATT agreement. The second section considers new farm policy tools that may be used to meet policy objectives. The third section analyzes the effects of a new farm policy direction on agriculture.

Redefining farm policy goals

U.S. farm policy goals are generally taken for granted. Since the Great Depression, farm programs have been guided by three goals: to provide farmers a stable and fair return for their products; to encourage a farm structure of small, family-sized producing units; and to foster an ample, healthful food supply for consumers. Through more than a dozen quadrennial reviews of farm policy, the same goals have been assumed but rarely debated. Instead, more attention has been paid to making adjustments in farm commodity programs, the mainstay instrument of U.S. farm policy. Some would argue that these programs themselves have become the policy, that the means have become the end.[1]

By forcing change in the operation of farm programs, including U.S. farm programs, a new GATT accord may also encourage a timely reappraisal of farm policy goals. This effect of a GATT accord on policy goals seems much less understood than the obvious effect an accord will have on the workings of commodity programs. Still, the link between the GATT and U.S. farm policy—its goals and programs—was clearly established by Secretary of Agriculture Clayton Yeutter: "We simply cannot rationally construct farm legislation for the 1990s until we know the outcome of the Uruguay Round."[2]

GATT's link to program and policy

The Uruguay Round of the GATT has one main objective in agriculture: to reduce or eliminate trade-distorting agricultural subsidies. Currently, farm programs in many countries transfer incomes from consumers to farmers either by restricting imports or by supporting domestic farm prices at high levels. Both methods have the effect of depressing world market prices. When imports are restricted, consumers pay higher prices for relatively scarce domestic production; at the same time, large foreign supplies remain in the world market and thereby depress world market prices. When governments support farm prices above market levels, farmers produce more than domestic markets can absorb, and the surplus flows into the world market, depressing prices. While helping importing countries, the low world prices hurt all producing countries that export farm products, including many heavily indebted developing countries. The Uruguay Round seeks to prevent these trade distortions.[3]

[1] For example, see Willard Cochrane, "A New Sheet of Music," *Choices*, premiere issue, 1986.

[2] From Secretary Yeutter's confirmation hearing before the Senate Agriculture Committee, February 16, 1989.

[3] For a full discussion of the trade distortions that arise from agricultural subsidies and their cost to consumers, see Alan

Clearly, a decision to liberalize agricultural trade in the Uruguay Round will profoundly affect U.S. farm policy. The direct linkage of GATT to U.S. farm programs relates more to how programs are implemented than to why the programs exist.[4] But changing the method of farm income support raises questions about the goals that underpin programs.

In particular, a GATT agreement to phase out trade-distorting agricultural programs would require eliminating or radically overhauling some U.S. farm programs. For instance, the deficiency payment program—a mainstay in supporting farm incomes—would have to be radically modified, and the Export Enhancement Program would have to be eliminated. Both programs would be disallowed because they directly affect the prices and terms at which world food trade is conducted.

But the agreement would not prohibit programs that support farm incomes without distorting trade or world market prices. That is, the GATT accord would allow the government to send direct income transfer checks to farmers, but would disallow support via traditional commodity programs. In making farm payments less complex, however, a new GATT accord would also have the effect of forcing U.S. policymakers to reassess why the programs ought to exist. By restricting the method of farm income support, a new GATT accord would force U.S. farm policymakers to decide whether, and to what degree, the public should continue to support the incomes of farmers.

Farm policy goals for the 1990s

Do traditional policy goals represent a relevant blueprint for crafting U.S. farm programs in the 1990s? Two issues will be at stake in addressing this question. The first issue is the role of farm income transfers in modern agriculture, especially as they relate to a broader objective of boosting the rural economy in general. And the second issue is the growing public concern about food safety and the environment. Farm income transfers will be the source of greatest debate, and the debate is likely to be shaped by the outcome of the GATT negotiations.

Farm income support objectives. Historically, farm income programs have been intended to help small farms. But dramatic changes in the structure of agriculture during the past decade suggest that goal needs to be reevaluated. Large farms now dominate U.S. agriculture. Many of these farms are still controlled by families, but the farms operate much like similarly sized urban small businesses. The largest 317,000 U.S. farms—those with annual sales greater than $100,000—produce three-fourths of the nation's food and fiber (Table 1). From 1983 to 1987, these farms received an average of 61 percent of all direct government payments to agriculture. In 1987 these large farms had average assets of $1.2 million and average gross

Barkema, David Henneberry, and Mark Drabenstott, "Agriculture and the GATT: A Time for Change," *Economic Review*, Federal Reserve Bank of Kansas City (February 1989).

[4] In defining the boundaries of the GATT's concern, Dale Hathaway states, "The negotiations are not addressing how much income is transferred to the farm sector in individual countries. If countries choose or feel compelled to make large income transfers to their farm populations, it is their prerogative to do so." Institute for International Economics, *Agriculture and the GATT: Rewriting the Rules* (Washington, D.C.: 1987), p. 138.

TABLE 1
Size structure characteristics of U.S. agriculture, average levels for 1983-87

Annual sales	Number of farms (thousands)	Percent of all farms	Percent of direct government payments	Percent of gross U.S. farm sales	Percent of net cash income
Less than $40,000	1,635	72.0	15.0	10.1	1.0
$40,000 to $99,999	321	14.1	23.9	14.9	13.3
$100,000 to $249,999	218	9.6	32.9	24.1	25.6
$250,000 to $499,999	72	3.2	18.0	18.1	21.6
More than $500,000	27	1.2	10.1	32.8	38.5
Addendum: More than $100,000	317	14.0	61.0	75.0	85.7
All farms	2,272	100.0	100.0	100.0	100.0

Source: Economic Research Service, U.S. Department of Agriculture, *Economic Indicators of the Farm Sector, National Financial Summary, 1987.*

incomes of $355,000. It is difficult to argue that such farms should be the targets of public programs designed to support their incomes.

Small farms, meanwhile, are much less important than large farms in U.S. agriculture. The smallest 1.9 million farms—those with annual sales less than $100,000—control only 25 percent of all farm sales and receive 39 percent of government payments. While these farms receive government payments disproportional to their sales, farm policy has always had a nominal goal of providing most of the benefits to the smaller, family farms. By that criterion, current programs fall short. The smallest 86 percent of the farms receive less than 40 percent of the program benefits. These small farms account for only 14.3 percent of agriculture's net cash income. Small farms typically depend on off-farm employment for nearly all of their income and thus are far more affected by general economic policies than by farm policy.

The distribution of government farm payments is generally not understood by the public. U.S. taxpayers supported record government spending for agriculture in the 1980s out of a belief that most of the benefits would flow to medium-sized farms and thus would preserve "family farms." Instead, large farms were the principal beneficiaries, a fact hidden in a battery of complex commodity programs the public generally does not understand. By making farm income support programs operate more like direct income transfers, government subsidy of farm incomes will become more visible to the general public. Thus, a new GATT accord may lead the public to question the value of farm income programs.

Some policymakers might want to reform income support programs and target payments more to small farms. But economic efficiency

argues against supporting only small farms. The steady march of agricultural technology has made traditional small farms much less cost efficient. Significant economies of scale, along with commodity programs biased toward larger farms, help explain the greater concentration in farm production noted above. Thus, if U.S. farm programs were re-targeted at only small farms, more of the farms would stay in business and thereby raise the cost of U.S. farm products to U.S. consumers and foreign buyers.

Who then should U.S. farm programs benefit, the large farms that already reap the greatest support or the small farms that the programs were first created to help? The answer rests almost entirely on society's values for agriculture and rural America and on agriculture's place in the rural economy. In establishing those values, the public almost certainly will take note of the painful economic adjustment that occurred across much of rural America in the 1980s.

Farm income and rural development objectives. An assessment of rural economic change in the 1980s reveals that farm policy no longer has sweeping impact on the whole rural economy, as it once did. The reason is simple: agriculture is now a relatively small portion of the rural economy. In the 1930s, one in four Americans lived on a farm, and one in two rural Americans lived on a farm. Today, in contrast, only one in fifty Americans lives on a farm, and less than one in twelve rural Americans lives on a farm.[5] Measured another way, rural counties whose economies depend principally on agriculture account for only 11 percent of the rural population.[6] Meanwhile, more than a third of the rural population depends principally on manufacturing, an industry beyond the reach of farm policy.

A new balance must be struck between the goals of farm and rural policy. Historically, the public has given strong support to farm programs partly because those programs were a major boost to the rural economy overall. Now the nation must decide whether supporting farm incomes is a worthy goal in and of itself. At the same time, the public must decide whether new channels of public support should be found for lagging parts of the rural economy.

In short, public support of farmers' incomes, a policy goal that has been taken for granted for more than a half century, is about to be debated. It is difficult to imagine the United States will abrogate farm income support as a goal of farm policy. Despite a more concentrated farm structure, agrarian values still carry considerable weight in Congress and public opinion. Nevertheless, a more transparent method of supporting farmers—the net effect of a new GATT agreement—as well as a persistently weak rural economy less dependent on farming almost certainly would diminish public support for farmers. Rural development initiatives, meanwhile, seem likely to gain support in the period ahead.

[5] The relative importance of farming is even less if the numbers are limited to full-time, commercial farms (those with annual sales greater than $40,000). Only one in 175 Americans lives on a commercial farm, while only one in 50 rural residents lives on such a farm. U.S. Department of Commerce, *Statistical Abstract of the United States*, 1988, Tables 1 and 1055.

[6] Federal Reserve Bank of Kansas City, *Rural America in Transition* (Kansas City, Mo.: 1988), p. 17.

Other objectives. Although a reassessment of farm policy goals will center on farm income support and rural development concerns, other policy objectives will also receive growing attention. Two emerging goals are worth noting in the context of overall policy reassessment.

The first goal is food safety. An ample, healthful food supply has always been an important goal of U.S. farm policy and has spawned programs in the U.S. Department of Agriculture like meat and poultry inspection. But growing consumer fears about the safety of the nation's food supply are moving food safety higher on the public policy agenda.[7] Pesticide use in food production, especially in foreign countries where laws are much more lax, could lead to new rules that would more strictly regulate the chemicals U.S. farmers could use and restrict the importation of products that do not meet U.S. food safety standards.

The second goal likely to receive increasing attention is agriculture's impact on the environment. Throughout the 1970s and 1980s the Environmental Protection Agency and other federal agencies wrote a number of new rules and guidelines regulating the use of chemicals in agriculture. On the whole, some changes in the industry did occur, but the toll of agricultural chemicals on the environment has continued to mount.

Rising concern over rural groundwater quality is rapidly moving the environment toward one of the principal items on the agricultural policy agenda. The USDA estimates that nearly half of the counties in the United States have the potential for some form of groundwater contamination due to agricultural chemicals. Three-quarters of these counties are rural.[8] Currently, no comprehensive federal law protects groundwater. The next farm bill may be viewed as an opportunity to pass such legislation.

Summary

A potential new GATT accord to liberalize agricultural trade will force change, not only in the modus operandi of U.S. farm policy, but also in the objectives that guide it. A reappraisal of agricultural policy objectives is well timed. After a half century of neglect, policy goals should be reexamined. Goals appropriate to the 1990s would be extremely useful in implementing the program changes a GATT agreement would require.

Several objectives are likely to be identified for the 1990s. Farm income support will continue, although the level of support will decline

[7] Food safety concerns in the United States have recently received prominent attention in the news media. A ban on the importation of Chilean fruit and the reluctance of consumers to purchase apples treated with the pesticide alar have led to many calls for improved measures to guarantee a higher health standard for food products.

[8] The groundwater problem could affect up to 50 million people, with about a third of them living in rural areas. The exact nature of the problem is difficult to assess because many rural areas do not monitor their water supplies for agricultural contaminants. Thomas Holmes, Elizabeth Nielsen, and Linda Lee, "Managing Groundwater Contamination in Rural Areas," *Rural Development Perspectives*, vol. 5, (October 1988), pp. 35-40. For further discussion, see Elizabeth Nielsen and Linda Lee, *The Magnitude and Costs of Groundwater Contamination from Agricultural Chemicals*, Economic Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 576, October 1987.

from levels in the 1980s and the public could choose to direct payments away from larger commercial farms. Rural development is likely to grow in importance as an objective. Food safety and agriculture's effect on the environment, especially on groundwater supplies, will receive more emphasis in shaping agricultural programs.

Farm policy tools for the 1990s

With farm policy objectives in hand, the critical issue for farm policymakers will be crafting programs to meet the objectives without violating the terms of a new GATT agreement. Ultimately, the Uruguay Round seeks to ensure that all national farm policies—whatever the intended objective—do not distort world agricultural trade. For the United States the immediate issue will probably be to design commodity or alternative programs that support farm income without distorting trade. Farm income support may someday wane as a goal of public policy, as the policy focus gradually shifts to the well-being of rural communities. But such programs designed to support farm incomes almost certainly will be in place over the next several years at least.

Limits to changing U.S. farm policy

The GATT confronts U.S. farm policymakers with a difficult choice. They can use a GATT agreement as an opportunity to introduce sweeping change in farm policy, such as transferring income to farmers directly by sending them government checks. Or, they can proceed cautiously, making incremental revisions in current U.S. farm programs. Regardless of which alternative is chosen, the ultimate objective will be to meet the goals of a new GATT agreement, while still achieving domestic farm policy goals.

Policymakers will base their choice on two factors: a long history of federal involvement in agriculture and the current political support for farm programs. A history of farm programs spanning more than 50 years will weigh heavily against drastic change in U.S. farm programs. Policymakers will note that past federal programs have been responsible for influencing the financial decisions of the nation's farmers in the 1980s and before. They will recognize that the benefits of U.S. farm programs have been capitalized into farmland values. And with the deep farm recession of the 1980s and the costly policy responses that the recession spawned still fresh in their minds, policymakers almost certainly will avoid drastic shifts in policy that would undercut a three-year-old farm recovery.

Political factors similarly appear to argue against sweeping change in farm legislation. Although difficult to gauge, the political support for current farm programs remains relatively high, certainly higher than farming's small share of the total population would at first suggest. The Food Security Act of 1985 passed the House and Senate by wide majorities. Support for that legislation has not waned in the wake of its record cost of more than $125 billion. To the contrary, members of Congress have lauded the success of the legislation in assisting U.S. agriculture's recovery.

In short, a new GATT agreement will dictate change in U.S. farm programs, but historical and political factors will probably limit the way that change will be introduced and ultimately achieved. Farm programs are too deeply embedded in U.S. agriculture and in Congress to undergo major change quickly. It

is far more likely that policymakers will craft changes that work within the board parameters of existing farm programs.

Farm income support is likely to continue as an objective of farm policy, both here and abroad. Against such a backdrop, can a new method be devised to meet farm income objectives without distorting world agricultural trade? Finding an appropriate new method now, when the Uruguay Round is in the midst of tough negotiation, may be important to the eventual success of the round. Without a clear alternative to current farm programs, many countries may resist any attempts to liberalize agricultural trade rules.

Reducing policy-induced trade distortions by severing farm income support from production decisions has been called "decoupling." Complete decoupling would require that farm income subsidies be completely unrelated to the amount produced. Although any form of farm income subsidy is likely to hold more resources in farm production than would otherwise be the case, decoupled payments would reduce market distortions by allowing price signals to tell farmers how much to produce.[9] Consequently, social goals for farm incomes could be met with far fewer distortions in domestic and world prices.

Two significant problems, however, are likely to limit the acceptance of decoupling in its purest sense. First, decoupling lifts the veil of complexity that now cloaks farm subsidies, baring them to public scrutiny. Decoupled payments could be seen as welfare payments, an unpalatable outcome for farmers and a less-deserving public policy objective for consumers, as discussed above. Second, decoupling would require the development of an alternative system to distribute subsidies, one based on some factor other than production. In short, decoupling confronts policymakers with hard decisions on who should be eligible for subsidy payments and how large individual payments should be.

Despite these inherent problems with the concept of decoupling, a promising recent revision in the decoupling concept could make the idea a workable solution for the United States and others. The modified approach, developed by David Blandford and others, would continue the current policy of supporting farm incomes with subsidized farm product prices.[10] But the quantity of production eligible for price sub-

[9] In the short run, when many inputs are fixed, decoupling of farm income subsidies from farm output prices would allow farmers to base short-run production decisions on undistorted market prices. In the long run, with all inputs variable, farm income subsidies of any kind—regardless of whether they are decoupled—increase the profitability of farm production relative to other enterprises. The result is a relatively larger concentration of resources in farming and larger farm output than would be obtained in a completely free market. A gradual winding down of farm subsidy payments would be required to eliminate this longer run market distortion.

[10] For a more thorough description of this method of breaking the link between farm income support and world trade distortions, see David Blandford, Harry de Gorter, Bruce Gardner, and David Harvey, "There Is a Way to Support Farm Income with Minimal Trade Distortions," *Choices* (First Quarter 1989), pp. 20-21, 24-25; and David Blandford, Harry De Gorter, and David Harvey, "Production Entitlement Guarantees (PEGs): A Minimally Distorting Method of Farm Income Support," a paper prepared for the International Agricultural Trade Research Consortium Symposium, "Bringing Agriculture into the GATT," Annapolis, Md., August 18-19, 1988.

sidies would be limited, allowing marginal production decisions to be based on market prices. As a result, excess farm production would be curtailed.

Under the modified decoupling approach, each country would be free to vary the amount of the farm price subsidy depending on the degree of farm income support desired. But the quantity of output eligible for subsidy would be strictly bound in the GATT accord to an amount less than each country would produce in a completely free world market. The developers of this modified decoupling concept have called the subsidized quantity the Production Entitlement Guarantee, or PEG, quantity. Farmers in each country would be free to produce more than the PEG amount, but the additional production could be sold only at the prevailing world market price. The result would be identical to that obtained under full decoupling: Farm incomes would be supported at the desired level, but marginal production decisions in each country would be determined by unfettered market forces.

Although determining the PEG quantity for each producing country could be difficult, simply reducing the quantity eligible for subsidies in each country from current levels would be a useful first step. For example, the developers of the PEG concept have estimated that limiting the amount of production eligible for subsidies (the PEG amount) in each country to 80 percent of 1986 production levels would permit world market prices to rise, on average, to nearly 98 percent of estimated free trade levels.[11] Additional progress in eliminating distortions in world agricultural markets could be made by scheduling further reductions in PEG quantities and subsidies as part of the Uruguay Round agreement or an agreement in subsequent GATT rounds.[12]

In sum, the modified decoupling of farm payments proposed in the PEG concept would avoid the major pitfalls of decoupling while achieving the major objective of decoupling—allowing undistorted price signals to reach farmers. Implementing a PEG-style farm program in the United States and other producing countries would reduce global overproduction and allow farm commodity prices to rise in world markets. Thus, a PEG-style program could be an important first step in attaining the Uruguay Round's objective.

Redesigning U.S. farm commodity programs

Applying this modified decoupling of farm income payments to the U.S. grains and cotton programs would be relatively straightforward.[13] In effect, the commodity loan program

[11] Estimates suggest that if each country set PEG amounts equal to 80 percent of 1986 production levels, beef, pork, and poultry prices would rise to more than 99 percent of estimated free-world market prices. Wheat, corn, soybean, and cotton prices would rise to 97-99 percent of estimated free-world market prices. See footnote 10.

[12] See footnote 9.

[13] This discussion focuses on the U.S. wheat, rice, feed grain, and cotton programs as specified in current farm policy legislation, the Food Security Act of 1985. These policies are the most expensive U.S. farm programs and have been a key source—along with similar programs in the European Community—of the trade frictions that have provided the impetus for reform in the Uruguay Round. The decoupling concept described here could readily be applied to programs

would be eliminated, deficiency payments would be limited to a smaller quantity of farm production, and acreage reduction requirements would be scrapped.

Current farm programs in the United States are based on two support prices: the loan rate and the target price. As legislated by Congress, the loan rate is usually close to the average market price, but the target price is usually well above market prices. Each farmer who elects to participate in the government program for a specific crop is guaranteed to receive at least the loan rate for the farm's entire production. In essence, the loan rate is the price at which the government will acquire the crop if the farmer cannot receive a higher market price.[14] In addition, participating farmers receive a "deficiency" payment equal to the difference between the target price and the higher of either the loan rate or the market price. Although a participating farmer's entire production is eligible for the loan rate, only a predetermined quantity of production—each farm's "program production"—is eligible for deficiency payments. Program production is the product of the farm's historical average yield and "base" acres—the number of acres the farm is allotted to produce the particular crop, normally a function of historical crop patterns. In sum, the price participating farmers receive for the program quantity of production equals either the loan rate or the market price—if it is higher than the loan rate—plus a deficiency payment that makes up the balance of the target price.

The three panels of Figure 1 describe the current operation of these farm programs and the modifications that would implement a PEG program consistent with the GATT's objectives.[15] Panel A shows market conditions in the absence of any farm programs; Panel B shows market conditions under current farm programs; and Panel C shows market conditions under a PEG program. The line labeled S in all three panels is the supply curve showing the quantity U.S. farmers would produce at various prices. The line labeled D shows the total quantity U.S. and foreign consumers will buy from U.S. farmers at various prices. As shown in Panel A, the market would be in equilibrium at price P_M and quantity Q_M with no farm program. Without any distortions to production incentives, the quantity U.S. farmers are willing to produce is equal to the quantity U.S. and foreign consumers wish to buy at the free market price, P_M.

The current farm program affects both the quantity of farm output and the prices at which it is sold, as is shown in Panel B. The loan rate, P_L, in Panel B is approximately equal to the

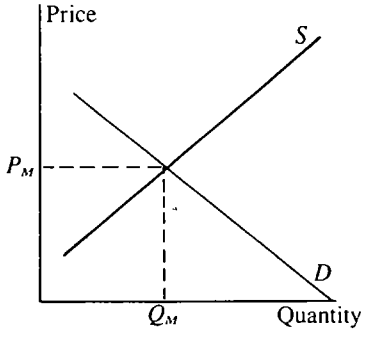
for other commodities. For each commodity, the key would be to limit the quantity of production eligible for a per-unit subsidy to an amount less than what would be produced in the absence of all support programs. Additional units of production beyond the subsidized quantity would be sold at market prices and would receive no subsidy.

[14] At harvest, any farmer who has elected to participate in the program for a particular crop may use the crop as collateral for a government loan in an amount equal to the loan rate times the size of the crop. Later, if the market price rises above the loan rate, the farmer may repay the government loan plus interest and sell the crop at the higher market price. If the market price remains below the loan rate (plus interest), the farmer may forfeit possession of the grain to the government and keep the loan proceeds.

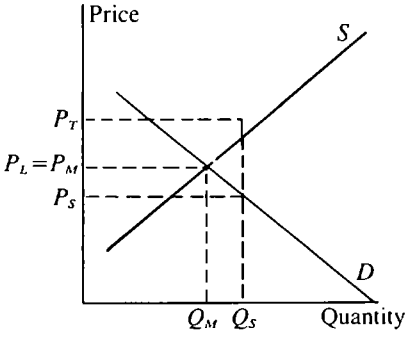
[15] The appendix provides a more complete development of this graphical presentation of domestic farm programs and their impact on world markets.

FIGURE 1
U.S. farm output market under alternative farm programs

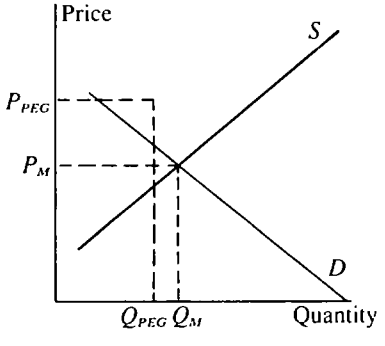
Panel A
No farm program



Panel B
Target-price program



Panel C
PEG program



equilibrium world market price, P_M. With the target price, P_T, greater than the market price, P_M, farmers elect to participate in the government program.[16] But the production eligible for the target price guarantee is fixed at Q_S. Thus, the lower portion of the effective supply line is vertical at quantity Q_S. The quantity Q_S is greater than the equilibrium quantity, Q_M, and the excess production can be absorbed by world markets only at a lower world market price, P_S. The policy-induced excess production and attendant decline in world market prices are the principal concerns of the Uruguay Round.[17]

The modified decoupling of government payments from production levels would support farm incomes at current levels without inducing excess production and the associated slump in world market prices. In essence, the

[16] To be eligible for these program benefits, each participating farmer must agree to idle a portion of the farm's base acreage. The acreage idling requirement helps limit excess production that would otherwise result from the high target price. Because farmers incur ownership and some variable costs on land they must idle to participate in the farm program, the effective target price farmers actually receive is somewhat less than the legislated target price. Thus, P_T in Figure 1 represents the effective rather than legislated target price.

[17] As in the United States, the European Community and other producing nations operate farm programs that encourage excess production and drive down world market prices for farm products. As a result, global farm policies designed to support farm incomes have become increasingly expensive. Soaring farm program costs at home and abroad have provided much of the impetus for policy reform in the Uruguay Round. Countries that are primarily food importers, however, benefit from the discount-priced glut in world grain supplies. For a more detailed assessment of the Uruguay Round's objectives, see Barkema, Henneberry, and Drabenstott, "Agriculture and the GATT . . . ."

PEG program would reduce the quantity of production eligible for deficiency payments, but would maintain farm income at the desired level by increasing the size of per-unit deficiency payments. As shown in Panel C, the amount of production eligible for deficiency payments would be reduced from the current program quantity, Q_S, to the PEG amount, Q_{PEG}. Farmers would always produce at least the PEG amount to receive the maximum amount of deficiency payments. A number of different methods for determining PEG amounts on individual farms could likely be devised, but assigning PEG quantities as some fraction of each farm's current program production level would probably be the easiest plan to implement.[18] Regardless of how PEG quantities are determined, the key to the modified program is that the quantity of production, Q_{PEG}, eligible for a subsidy be set below the equilibrium quantity that would be produced with no subsidies in place, Q_M.

Farmers would not be required to hold land out of production to participate in the modified program. Instead, they would be free to produce as much as they wished, but production in excess of the PEG amount Q_{PEG} would be sold at market prices with no subsidy attached. The loan rate would be eliminated and the target price raised to P_{PEG}, increasing the size of deficiency payments to maintain farm incomes at targeted levels. As shown, farmers would expand production along the supply line up to the market price, P_M. As a result, farmers would produce the equilibrium quantity, Q_M, and receive the equilibrium price, P_M, for their entire production. In addition, farmers would receive a deficiency payment equal to the difference between the new target price, P_{PEG}, and the market price, P_M, payable on the PEG quantity, Q_{PEG}. Consistent with the goal of the Uruguay Round, the production and market price outcomes of the PEG program in Panel C would be identical to the outcomes obtained if no farm policies were in place (Panel A).

In summary, current U.S. farm programs could be modified to reduce the programs' contribution to world market distortions and still carry out an objective of supporting farm incomes. The redesigned programs would retain the deficiency payment structure of the current programs while greatly increasing the influence of market prices—instead of government support prices—on marginal production decisions. By reducing market distortions and curtailing excess production, a more efficient allocation of resources between agriculture and other industries would be attained. As a result, the total cost of supporting domestic farm incomes would fall as farm programs were modified to be consistent with the goal of the Uruguay Round.[19]

[18] For example, PEG quantities on each farm could be set by reducing either program yields or program base acreage to some percentage of current levels. Although this method of allocating PEG amounts would retain the current program's structure and thus would be relatively easy to implement, it would also retain any distortions resulting from the current allocation of base acreage. Alternatively, PEG allocations could be based on other objective criteria—such as soil productivity ratings—rather than historical production levels that have themselves been distorted by farm programs.

[19] Production of the equilibrium quantity Q_M rather than the excessive amount Q_S represents a more efficient use of resources. The improved resource allocation allows farm incomes to be supported at targeted levels at lower cost to

The effects of redesigning farm policy

A new GATT agreement to phase out trade-distorting agricultural subsidies will encourage a reappraisal of U.S. farm policy objectives and will dictate changes in the operation of commodity programs. The previous section showed how U.S. farm programs might be redesigned if supporting farm incomes remains a goal of U.S. agricultural policy. How would such redesign of domestic farm programs affect U.S. agriculture and rural America? This section briefly summarizes the impact of a GATT-consistent policy change on farm incomes and asset values, agribusinesses, and rural communities.

Farm incomes and asset values

Making U.S. farm programs consistent with prospective changes in the GATT could cause farm incomes to go up or down. Programs can be set to provide any level of farm income and still not distort trade. Thus, the key question will be how much value the public attaches to a farm income support objective.

As suggested above, a more transparent means of transferring income to farmers seems likely to erode public support for such programs. Further reducing public support may be the fact that U.S. agriculture will be relatively competitive in the freer world market that could result from a new GATT accord.[20] Moreover, as federal budget pressures mount, current farm income support programs may also be viewed as the source of funds for addressing other policy goals, such as rural development, food safety, and the environment. For all these reasons, fewer dollars will likely flow into redesigned farm income programs.

Changing the method of distributing farm income subsidies to be consistent with the GATT has important implications for the value of farm assets—especially farmland. The effects of farm policy reform on farmland values would almost certainly be considered in any redesign of domestic farm policy. Quite simply, land values are critical to farm balance sheets, accounting for three-quarters of all farm assets. Thus, policymakers would likely avoid an abrupt change in policy that could cause farmland values to plummet, regardless of whether the new policy left farm incomes at high levels.

To keep farmland values from plummeting, the linkage between commodity programs and farmland values could be left intact.[21] Under current programs, a farm's base acreage—the percentage of a farm's total acreage that is eligible to grow program crops and thus garner farm income payments—is an important determinant of the farm's value. If decoupling broke this linkage between payments and farmland, farmland prices would almost certainly fall. But if

consumers. In short, the improved program design results in a larger income to be divided between farmers and consumers. For a more detailed account of the effects of farm and trade policy reform on farmer and consumer incomes, see Barkema, Henneberry, and Drabenstott, "Agriculture and the GATT . . . ."

20 Barkema, Henneberry, and Drabenstott, "Agriculture and the GATT . . . ."

21 For a summary of the factors determining farmland value, see Alan Barkema, "Farmland Values: The Rise, the Fall, the Future," *Economic Review*, Federal Reserve Bank of Kansas City (April 1987), pp. 19-35.

the linkage between government payments and base acreage were preserved in the modified decoupling of payments and production described in the preceding section, a precipitous decline in farmland values could be avoided.[22] The accompanying box describes one method of limiting the effects of farm policy reform on farmland values.

Agribusinesses

Cushioning U.S. agribusinesses from the impact of farm and trade policy reform may be more difficult than cushioning farmland values. Declines in farm incomes and farmland values that might otherwise result from adapting U.S. farm policies to the principles of the GATT can be avoided by adjusting PEG payments to desired levels, as explained above. But as U.S. farmers cut back production levels to adjust to the new market environment existing after farm policy reform, demand for farm production inputs would almost certainly decline, pulling down input supplier revenues as well.

An estimate of the impact of multilateral farm and trade policy reform on input suppliers can be gleaned from estimates of how multilateral trade reform would affect farm output. The USDA has estimated that the value of world agricultural production would fall nearly $29 billion from current levels with multilateral farm and trade policy reform (Table 2). U.S. farm production would absorb a total of $5.4 billion of the worldwide decline due to significant cutbacks in the value of crop and dairy production. These declines in the value of production in the United States would occur despite rising world market prices as excess production is curtailed.[23] As the amount of farm output falls in the United States, demand for farm production inputs would almost certainly weaken.

Slumping demand for farm production inputs would translate into smaller revenues for input suppliers. Input suppliers may be able to regain part of the revenue loss attributable to a decline in demand for farm production inputs by raising prices. Price increases may not depress sales sharply because demand for farm inputs is generally believed to be inelastic.[24] Neverthe-

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22 Initially, the linkage between government payments and farmland would support farmland values. If farm income support were gradually reduced in future years, the linkage between payments and farmland would allow an orderly transition in the farmland market. See footnote 9.

23 The estimated increase in world market prices with multilateral farm and trade policy reform ranges from 3 percent for oilseeds and products to 27 percent for dairy products. Vernon Roningen, John Sullivan, and John Wainio, "The Impact of Removal of Support to Agriculture in Developed Countries," paper presented at the American Agricultural Economic Association meeting, East Lansing, Mich., August 1987.

24 Demand is said to be inelastic when a given increase in price causes a proportionately smaller decrease in the quantity demanded. Thus, the price increase more than offsets the resulting decline in sales, and total revenue increases. For example, estimated farm input elasticities for agricultural chemicals (−0.427), purchased feed, seed, and livestock (−.182), and other miscellaneous inputs (−.480) are all inelastic (between 0 and −1). See Roberto R. Saez and C. Richard Shumway, "Multiproduct Agricultural Supply Response and Input Demand Estimation in the United States: A Regional Profit Function Approach," Technical Report No. 85-3, Texas Agricultural Experiment Station, Department of Agricultural Economics, Texas A&M University, 1985.

TABLE 2
Changes in value of farm production under multilateral policy reform
(millions of dollars)

Product	United States	European Community	Japan	World
Meat and eggs	+6,323	−17,944	−5,733	−10,503
Dairy products	−3,707	−1,260	−1,289	−2,293
Food crops	−2,278	−1,187	−14,309	−12,213
Feed crops	−2,119	−2,074	−319	−2,838
All commodities*	−5,390	−25,913	−22,019	−28,902

*In addition to commodities listed, totals include oilseeds and products and other miscellaneous crops.
Source: U.S. Department of Agriculture. See footnote 18.

less, strong competition among suppliers of farm inputs would likely limit the ability of input suppliers to implement such compensating price changes. For an analytical description of how a new GATT accord would affect agribusinesses, see the appendix.

Rural communities

Just as policy reform seems likely to reduce agribusiness revenues, so it will apparently have some negative effects on farm-dependent rural communities. Barring a surge in export demand for U.S. farm products, such as occurred in the 1970s, the United States will produce less farm output in a world market free of trade-distorting subsidies, suggesting less land in production, fewer variable inputs, and probably fewer farmers. The fact that production decisions will be made on market conditions probably favors larger, more efficient producers. Thus, GATT-consistent policy reform may lead to fewer small rural communities in farm-dependent rural counties. As agribusiness services are concentrated in somewhat larger communities, those local economies will probably enjoy continued growth.

The trend to communities with larger market areas in agricultural regions is not new. It has proceeded at different rates for more than 50 years due to advances in technology, transportation, and communications. U.S. farm policy that encourages market outcomes will simply reinforce this existing trend.

Conclusions

U.S. agricultural policy is approaching a benchmark year. The current farm bill will expire in 1990 and, coincidentally, the Uruguay Round will terminate. For the first time, U.S. farm policy will be heavily influenced by considerations that transcend domestic social and economic goals.

A GATT agreement to liberalize agricultural trade would likely affect both the goals and

methods of U.S. farm policy. By making farm income transfers more direct and less complicated, the GATT accord would contribute to a reassessment of the traditional farm policy goal of supporting farmers' incomes. The skewed distribution of current farm subsidies to larger farms and the persistent weakness of the rural economy in the face of record farm spending are also raising questions about the validity of past goals. In short, new farm policy goals for the 1990s need to be defined.

U.S. farm commodity programs can be redesigned to satisfy the limits of a new GATT accord and still support farm incomes. A modified decoupling program, called the PEG program, could support incomes while still forcing farmers to base production decisions on market factors. Such a program could be designed to have a neutral impact on farm income and farm asset values. But because U.S. farm output is likely to fall under a freer world food market, agribusinesses and some farm communities may suffer some negative effects.

The impact of farm policy reform on U.S. farmland values

In the modified decoupling described in the preceding section, a Production Entitlement Guaranty (PEG) payment similar to current deficiency payments would be paid on a specified amount of production smaller than current program production levels. The cut in the quantity of any farm's production eligible for deficiency payments would tend to lower the annual income generated by that farm. Because farm income is one of the major determinants of farmland value, the value of the farm would be expected to fall. But an offsetting increase in the size of the deficiency or PEG payment paid for each eligible unit of the farm's production could support farm income—and farmland values—at current levels.

One way of reducing the amount of production eligible to receive PEG payments in the modified farm program described in this article would be to reduce each farm's base acreage while freezing program yields. In Figure 2, Panel A, the initial national supply of base acres is fixed and shown as the vertical line S_B. The initial number of base acres an investor would wish to buy at various base acre prices is shown as the line D_B. A cut in each farm's base acreage for a specific crop would reduce the fixed national supply of base acres from S_B to S_B'. A simultaneous increase in the income each base acre receives in PEG payments, however, would increase the demand for base acres, shown by the upward shift in base acreage demand from D_B to D_B'. As a result, the value of each base acre would rise from P_B to P_B'.

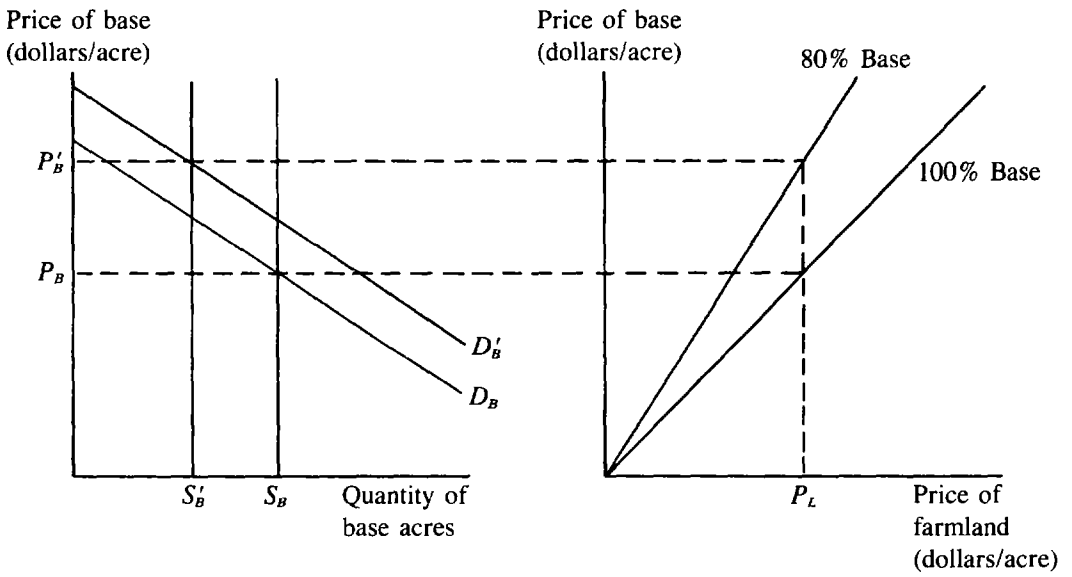
The relationship between the value per acre of the base acreage component of an individual farm and the price per acre of the entire farm is shown in Figure 2, Panel B. If a farm's entire acreage, for example, were eligible for deficiency payments, the farm's price would be equal to the value of its base acreage component. This relationship is shown by the 45 degree line labeled 100 percent base. But if the portion of the farm eligible for PEG payments were cut back to only 80 percent of the farm's total acreage, the price per acre of the entire farm would be less than the value per acre of base acreage. This new relationship between base acreage value and farmland prices is shown by the line labeled 80 percent base.

Together, the two diagrams of Figure 2 illustrate an example in which base acreage on an individual farm is cut from 100 percent to only 80 percent of the farm's total acreage as a means of reducing the quantity of subsidized production. The farm with 100 percent base is initially valued at P_L dollars per acre, equal to the value of an acre of base acreage, P_B dollars per acre. Although the portion of the farm eligible to receive production subsidies declines when its base acreage is cut by 20 percent, an offsetting increase in the subsidy paid on each base acre boosts the value of a base acre to P_B'. As a result, the price of the entire farm remains at P_L dollars per acre. In brief, a larger subsidy paid on a smaller quantity of production leaves the price of farmland unchanged.

This plan for maintaining farmland prices by attaching PEG payments to specific parcels of farmland is not contingent on the present allocation of base acreage. For example, similar analyses could be developed using historical program yields or soil productivity ratings rather than base acreage as the benchmark for

FIGURE 2

U.S. farmland market under a PEG program



determining PEG payments. In summary, this example shows that farmland values need not plummet if the Uruguay Round of the GATT negotiations succeeds in reforming farm policies.

Appendix
The impact of farm policies on domestic and world markets

Among the principal objectives of farm policy described in this article is the support of farm incomes. Unfortunately, many farm programs designed to support domestic farm incomes have important effects that spill over into foreign markets, distorting world trade patterns. One of the fundamental goals of the Uruguay Round of the GATT negotiations is to eliminate the trade-distorting effects of domestic farm policies. The graphical model presented here describes the trade distortions that can result from domestic farm income support programs. In addition, the model describes a method of providing domestic farm income support—the Production Entitlement Guarantee (PEG)—that minimizes harmful spillover effects in world markets. This narrative describes the external effects of U.S. farm programs, but the analysis could readily apply to farm programs of the European Community or other major producing countries.

Farm product markets

The three interrelated charts in Figure A1 describe the effects of U.S. farm policies on world agricultural trade. The key component of the analysis is the U.S. market for farm output shown in Panel A. The kinked line labeled D represents the total quantity of U.S. agricultural products that domestic and foreign consumers will buy at various prices. At prices above the kink, no domestic output is exported. (For simplicity, this portion of the demand curve was omitted from Figure 1.) At all prices below the kink, the United States exports farm products to other countries in addition to meeting the needs of U.S. consumers. The line labeled S shows the quantity U.S. farmers are willing to produce at various prices. At the equilibrium price, P_M, and equilibrium quantity, Q_M, the amount U.S. producers are willing to produce equals the amount U.S. and foreign consumers wish to purchase.

In Panel B, the quantities of U.S. output domestic consumers wish to buy at various prices, D_D, and the quantities of U.S. output foreign consumers wish to buy at various prices, D_F, are shown individually. Adding the quantity demanded by both foreign and domestic consumers at each price provides the total demand curve D, shown in Panel A. At the equilibrium world market price, P_M, U.S. consumers purchase quantity Q_D while quantity Q_X is exported from the United States to meet the needs of foreign consumers.

Foreign demand for U.S. farm products is determined in the rest-of-the-world (ROW) market (Panel C). The line labeled S_{ROW} shows the quantities foreign producers are willing to produce at various prices, and the line labeled D_{ROW} shows the quantities foreign consumers wish to buy at various prices. At the world market price, P_M, the quantity foreign producers are willing to produce, Q_{FP}, is less than the quantity foreign consumers wish to purchase, Q_{FC}. Thus, foreign consumers import quantity Q_X (Panel B) from the United States to satisfy the remainder of their needs not met by foreign producers.

The effects on world markets of two methods of supporting U.S. farm incomes—a target-price program and the PEG program—are also shown in these diagrams. As described in the

FIGURE A1
Impact of U.S. farm policies on domestic and world markets

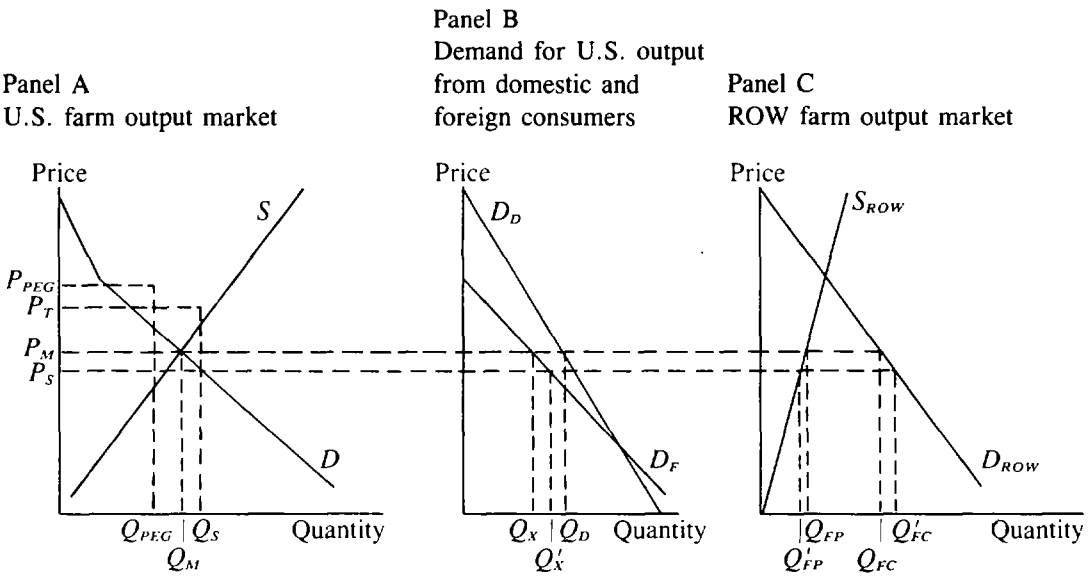


FIGURE A2
U.S. farmland market

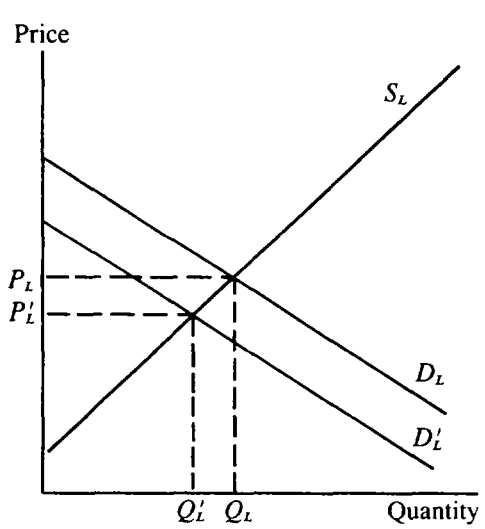
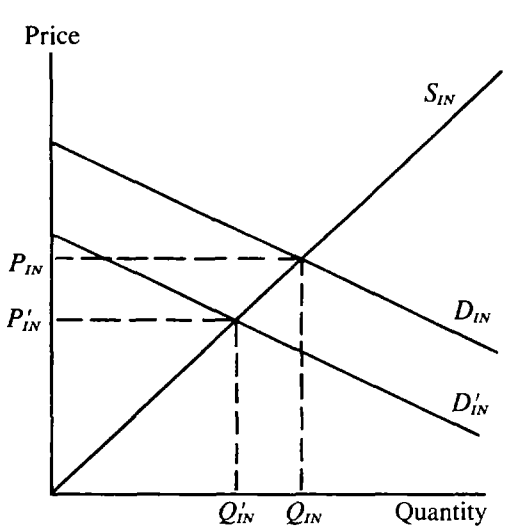


FIGURE A3
U.S. farm input market



Source: Adapted from Alex McCalla and Timothy Josling, *Agricultural Policies and World Markets*, (New York: Macmillan Publishing Co., Inc., 1985).

article, the high target price, P_T, encourages U.S. farmers to expand production to Q_S, the maximum quantity eligible for the target-price subsidy (Panel A). The excessive domestic production drives the world market price down to P_S. At market price P_S, however, the gap between the quantity foreign consumers wish to buy and the quantity foreign producers wish to produce in the rest-of-the-world market widens to Q_{FC}'-Q_{FP}' (Panel C). As a result, foreign consumers import a larger quantity from the United States to meet the remainder of their needs. Thus, U.S. exports expand from Q_X to Q_X' (Panel B). In sum, the U.S. target-price policy results in an increase in domestic production, a decline in the world market price, and an increase in domestic exports—all effects that the Uruguay Round seeks to avoid.

By changing its target-price policy to the PEG policy described in the article, however, the United States could maintain domestic farm incomes without distorting world markets. Under the PEG program, a higher support price, P_{PEG}, is paid on a smaller quantity of production, Q_{PEG} (Panel A). U.S. farmers are free to produce more than Q_{PEG} with the understanding that the additional output can be sold only at the prevailing market price. As a result, U.S. farmers reduce production from Q_S to Q_M and the world market price rises to P_M. U.S. farm incomes under the PEG plan include the sale of the entire domestic production, Q_M, at price P_M. In addition, domestic farmers receive deficiency payments equal to the difference between support price, P_{PEG}, and the market price, P_M, paid on quantity Q_{PEG}.

As the world market price rises to P_M, market distortions in the rest-of-the-world market disappear. The gap between foreign production and foreign consumption narrows to Q_{FC}-Q_{FP} (Panel C) as foreign production increases and foreign consumption decreases. As a result, U.S. exports return to the initial quantity, Q_X. On balance, the model suggests that changing the U.S. farm program from a target-price program to a PEG program eliminates market distortions at home and abroad.

The domestic farmland and farm inputs markets

The changes required to make domestic farm policy consistent with the goals of the Uruguay Round also affect other markets that are important components of the U.S. farm economy. The two markets that will be most affected are the domestic markets for farmland (Figure A2) and farm production inputs (Figure A3).

The U.S. farmland market shown in Figure A2 is closely related to the farm product markets described in the three panels of Figure A1. The farmland demand line labeled D_L shows the quantity of farmland domestic farmers will buy at various prices. The farmland supply curve, S_L, shows the amount of farmland that would be brought into production at various land prices. The price of farm products determined in Figure 1 determines the level or position of demand for farmland, D_L. If the price that U.S. farmers expect to receive for their output falls from the target price, P_T, to the world market price, P_M, (Panel A), the return to a farmland investment falls. As demand for land falls from D_L to D_L', land use slides down along the farmland supply curve, S_L (Figure A2). As a result, the price of farmland falls from P_L to P_L'. As explained in the article, however, a sharp fall in the value of farmland resulting from the implementation of a PEG program could be prevented by

attaching PEG payments to farmland just as deficiency payments are attached to base acreage under the target-price program.

The U.S. market for farm production inputs (Figure A3) is also closely related to the markets described in the other figures of this model. The line labeled D_{IN} shows the quantities of farm production inputs that U.S. farmers would buy at various input prices, and the line labeled S_{IN} shows the quantities of farm inputs agribusinesses would provide at various prices. As domestic farm production declines from Q_S to Q_M (Figure A1, Panel A) and domestic land use declines from Q_L to Q_L' (Figure A2) under the modified U.S. farm policy, demand for farm production inputs also falls. Decreased input demand is shown in Figure A3 as a downward shift in the input demand line from D_{IN} to D_{IN}'. With slumping input demand, input use would slide down the input supply curve from Q_{IN} to Q_{IN}', and input prices would fall to P_{IN}'. As a result, suppliers of farm inputs would realize smaller revenues. Although relatively small modifications of the current target-price payment mechanism could limit the impact of the new PEG program on farmland values, easy methods of cushioning the impact of the policy change on input suppliers may not be readily available.