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Predatory Versus Productive Government: The Case of U.S. Agricultural Policies

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Agricultural policy is a complex web of interventions covering output markets, input markets, trade, public good investments, renewable and exhaustible natural resources, regulation of externalities, education, and the marketing and distribution of food products. At the level of the federal government, these interventions have resulted in enormous budgetary costs; huge surpluses of farm products; major disputes with other countries; distorted international markets; and benefits to special interests that are often highly concentrated. The same programs, however, have been part of an agricultural sector whose productivity over much of the last century has been spectacular.

Do these massive governmental interventions correct for market imperfections, lower transaction costs, effectively regulate externalities, and enhance productivity? Or are these programs the result of manipulation by powerful commodity or agricultural interest groups actively engaged in rent-seeking or directly unproductive activities (Buchanan and Tullock 1962; Krueger 1974; Bhagwati 1982)? In this latter perspective, agricultural interest groups are presumed to behave much like the proverbial 800-pound gorilla—they walk where they want; they sit where they want; and they take what they want.

In the design and implementation of governmental policy in agriculture conflicts naturally emerge between public and special interests. A conceptual formulation that attempts to explain or prescribe public policy emphasizing only one of these interests is doomed to fail. Frameworks that neglect political forces and the role of special interest groups will have little explanatory power.

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Models that presume the government has no autonomy nor any interest in the size of the economic pie will also face serious limitations as explanatory, predictive, or prescriptive frameworks.

This essay will argue that agricultural policy in the United States has led to both the enhancement of efficiency through "productive policies" and the transfer of wealth and income to special interests through redistributive or "predatory policies." These two activities can be labelled as PESTs and PERTs. PEST policies, or political-economic-seeking transfers, are meant to redistribute wealth from one social group to another and are not explicitly concerned with efficiency. In contrast, PERTs, or political-economic resource transactions, are intended to correct market failures or to provide public goods; these policies have neutral distributional effects, at least in design (Rausser, 1982).

A review of the history of public policy in agriculture reveals not only tension between the PERT and PEST roles of the public sector, but also some coordination between these two types of activities. As different interest groups pressure the political process, the government trades off PESTs and PERTs in its attempts to acquire, balance, and secure political power. At times this has led to combinations of programs that appear incoherent. For example, conservation programs require the retirement of vulnerable acreage, while crop price supports penalize premature land retirement and create incentives for overutilization of vulnerable acreage. These apparent incoherencies, however, result from institutional arrangements that generate a government portfolio of productive and predatory policies. In such a world, the challenge for economists is to design and advocate policies that are both economically productive and politically sustainable.

Early Development of U.S. Agricultural Policies

Federal programs to assist the agricultural sector began in the second half of the 19th century. The period from 1850 through the early 1900s witnessed the emergence of important institutions aimed at lowering costs in the private sector. The Morrill Act of 1862 offered federal land grants to each state to establish free, public, higher education through the Land Grant College system. The U.S. Department of Agriculture, created in 1862, initially focussed on research, regulation, and information generation. The Hatch Act of 1887 set up a system of Agricultural Experiment Stations by providing annual grants to each state for agricultural research. The Smith-Lever Act of 1914 set up the Cooperative Extension Service system of county agents.

The grassroots organization represented by the county agent extension system proved to be an effective mechanism for communicating new agricultural technologies and knowledge directly to farmers. This organization also became the conduit for communicating back to the U.S. Department of Agriculture (USDA) and the land-grant universities signals on farm problems

requiring research. These early federal policies can largely be characterized as long-run institutional development, where the government was supplying public goods whose associated benefits and costs were widely dispersed.

A major resource promoting agricultural productivity has been the knowledge generated by public sector investments in research. This knowledge generation has repeatedly been shown to have significant influence on agricultural growth. Even so, the striking feature of agricultural research policies has been the overwhelming evidence of underinvestment. As Ruttan (1982) has shown, the rates of return to public good investments in agricultural research justify much higher levels of public research support.

Following the emphasis on public research, education, and extension support, legislation turned to the undesirable levels of rural infrastructure and problems of limited information. This legislation covered rural delivery of mail, soil conservation, agricultural credit, rural electrification, rural road building, and many other investments in the physical infrastructure of agriculture. These investments have been extensive. Pavelis (1985) has estimated that the federal government, "through direct construction or indirect cost sharing, has created up to 1975 about 45 percent of the value of all irrigation, drainage, and soil and water conservation facilities in the United States." Problems of limited information were addressed by other legislation that had the purpose of lowering transaction costs; for example, fertilizer and seed standards, weights, animal health, and food safety.

In more recent years, the evolution of many U.S. agricultural policies has demonstrated a distinct pattern. Early in the 20th century, enabling legislation was often justified as a means of correcting market failures and enhancing productivity. But once in place, these policies evolved into programs whose benefits were concentrated but whose associated costs were widely shared. Unsurprisingly, much of this legislation became a vehicle for codifying rent-seeking behavior. Examples of such agriculture policy evolution briefly described here include western resource and water development, soil conservation, environmental pesticide policy, and farm credit.

Western Resource and Water Development

Initially, the development of western water resources was viewed as promoting economic growth by turning "wastelands" into productive agricultural soils. Because of the potential concentration of transfers resulting from these policies, the Federal Reclamation Act of 1902 limited the size of those farms which could receive low-cost irrigation infrastructure and water to small-holder residents (160 acres per family member, or a maximum of 480 acres per household). The intent was to ensure that water projects benefited smaller farms rather than powerful land interests such as railroads, oil companies, or land speculators. These water resource projects were designed to be self-financed; project beneficiaries were expected to repay construction costs

over a 10-year period (Howitt, Mann and Vaux, Jr., 1982; Holmes, 1979; Worster, 1985).

However, as a result of one farm crisis following another from 1915 through 1930, the self-financing features were eliminated and reclamation construction funds were appropriated from the U.S. Treasury. Moreover, through a series of congressional enactments during the 1930s, the scope of reclamation policy was expanded to include activities such as fish and wildlife habitat development, flood control, navigation, and hydroelectric power generation and distribution. By the 1940s, the original intent of the 1902 legislation —to promote small-scale farmer settlement of the arid West—was all but forgotten. The acreage limitation provisions of the original legislation were never enforced. Once the court system was called upon to examine this lack of enforcement, the acreage limits were legislatively increased to 960 acres.[1]

The result of this history is that high water subsidies are available to selected farmers. For example, in the Westlands Water District, a part of the Central Valley Project in California, the difference between the actual cost and what farmers are currently paying translates into an average subsidy of approximately $500,000 per farm in the District (Reisner, 1986). California State Water Project officials are pursuing projects that will cost $212 per acre-foot and above, while some Central Valley Project farmers pay as little as $3.50 per acre-foot (Wahl, 1989). In Arizona, Scottsdale and Mesa have purchased water at total costs ranging from $200 to $300 per acre-foot, while recent desalting plant investments are expected to supply water at a cost of more than $1,000 per acre-foot.

Soil Conservation

A striking example of masking special interests by references to the public interest emerged with the passage of the Soil Conservation and Domestic Allotment Act of 1936. The dust bowl of the 1930s, dramatized by John Steinbeck's *The Grapes of Wrath*, provided the basis for a public perception that soil conservation was a serious social problem. The 1936 legislation marked the beginning of a long history of policies aimed both at commodity supply management and soil conservation. Specifically, the 1936 Act enabled farmers to receive soil conservation payments for reducing "soil-depleting" crops such as corn and cotton which, unsurprisingly, were also surplus crops. The focus on conservation emanated from concern about preserving and sustaining agricultural lands for future generations; "soil mining," erosion and "soil runoff" externalities were viewed as contrary to the public interest.[2]

[1]The major implementing agency for western water resource development has been the Federal Bureau of Reclamation. The water supplied by this Bureau at heavily subsidized rates to agriculture helps explain why the irrigation of just two California crops, alfalfa and cotton, takes as much water as is annually allocated to the state's entire population of 30 million.

[2]The U.S. Department of Agriculture has estimated that some 2 to 3 billion tons of soil are lost to erosion in the United States each year. Contrary to many popular press reports, this level of

The Agricultural Act of 1956 continued linking commodity supply management with soil conservation policy. The program was divided into two parts: a conservation reserve and an acreage reserve. The acreage reserve was to reduce the amount of land planted to the so-called program crops: wheat, cotton, corn, tobacco, peanuts, and rice. All farmers were eligible to participate in the conservation reserve, which allowed conversions of whole farms from cropland to soil-conserving uses. This program eventually enrolled nearly 30 million acres in the 1960s, moving marginal cropland into permanent pasture, timber, or recreational uses under contracts for a maximum of 10 years. It served the objectives of encouraging long-term adjustment of land and labor to nonfarm uses, soil conservation, and, to some degree, output management. However, almost all of the land in this conservation reserve returned to production during the 1973–1975 boom. In 1985, conditions were once again ripe for combining conservation and supply management. Farm production was generating enormous surpluses, and the environmental lobby was increasingly more effective. Accordingly, as of 1990, approximately 34 million acres have been enrolled in the conservation reserve program introduced by the 1985 Food Security Act.

A number of important lessons emerge from the evolution of commodity and soil conservation policies since the 1930s. In times of high agricultural supply and low prices, political opposition to supply-control policies can be countered when these policies are masked by conservation policies. When markets are expanding and prices are high, however, the public will not compensate farmers sufficiently to hold land out of production. Also, combining commodity and resource policies is far more difficult if institutional investments are not undertaken to establish an organization to sustain political support for these policies, a role effectively played by the soil conservation districts and/or the county agricultural adjustment committees.

Environmental Pesticide Policy

The origins of environmental pesticide policy began with the Federal Insecticide Act of 1910, initially developed to protect farmers from fraudulent claims of insecticide salesmen (Bosso, 1987). From these origins, the agricultural regulatory portfolio of the U.S. Environmental Protection Agency (EPA) can be traced. Today, this environmental and health hazard regulatory portfolio includes surface water pollution; groundwater pollution; air pollution;

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erosion is not ruining American farmland. This is simply because topsoil is a renewable resource; it can be replaced by organic matter from crop residues. As a result, the rate of net loss of topsoil in the United States is, in fact, very small. The pollution effects of soil erosion are a different matter; these impacts arise as offsite effects of wind and water erosion.

worker exposure to agricultural chemical inputs; endangered species (exposure to the harmful effects of pesticides applied to the fields and crops in their habitat); and dietary risk (pesticide residues may remain in agricultural products that reach the consumer).

Like western resource development and soil conservation policies, the initial legislation regarding environmental pesticide policy was justified on the grounds of reducing costs, but the policy that it spawned reflected political influence and power. Pesticide environmental policy of the 1950s and 1960s was firmly controlled by an agricultural chemical coalition comprised of the chemical industry, the USDA, and the U.S. congressional committees (Bosso, 1987; Mitchell, 1979; Macintyre, 1987). In the political science literature, this coalition of business, regulators, and politicians has been referred to as an "iron triangle."

As public awareness began to increase, this coalition was challenged first by the Pesticide Control Amendment of 1954 that required any registered pesticide to have a tolerance level set by the U.S. Food and Drug Administration (FDA) for acceptable residues. In 1958, the "Delaney Amendment" was passed which states simply that no (food) additive shall be deemed safe if it is found to induce cancer when "ingested by man or animal." This Amendment was vigorously opposed by agricultural chemical interests but without success; it passed easily.

Until the publication of Carson's (1962) *Silent Spring*, most people knew the benefits of pesticides, but very few had any knowledge of the possible environmental and health risks of pesticide use (Perkins, 1982). But the thalidomide scare of 1962 gave increased credibility to the Carson message. Slowly, a new breed of environmental activists emerged and turned to the court system to enforce the pesticide control laws. In 1969, the Environmental Defense Fund won a case against the use of DDT in the state of Wisconsin. As Bosso (1987) reported, this first state-level ban of DDT "sent shock waves throughout the community, the chemical industry, and government at all levels." Accordingly, the chemical industry and the USDA slowly lost their grip. As Wilson (1980, pp. 391) has observed, most of these so-called "iron triangle" coalitions "appear to be made of metal far more malleable than iron." Shortly thereafter, the Nixon Administration announced its intent to phase out all nonessential uses of DDT within two years.

Since then a new political coalition has emerged aimed at regulating agriculture's effects on the environment. Comprised of the environmental interest group organizations, EPA, and members and committees of Congress without agricultural ties, this coalition's concerns have moved beyond the quality of the food supply to include the external effects of agriculture on water and wildlife as well. These groups helped to enact the National Environmental Policy Act of 1969, the Clean Air Act of 1970, and to establish the U.S. Environmental Protection Agency (EPA).

Farm Credit

Farm credit legislation set up a system of farmer-owned cooperative banks composed of federal land banks (long-term debt), production credit associations (short-term debt), and a bank for cooperatives. The economic justifications for government sponsorship of the Farm Credit Banking System (FCBS) were market failures which led to less than an optimal amount of credit being offered to the agricultural sector. In particular, federal banking laws prohibited the emergence of national banks, and state banks could not easily diversify the regional components of agricultural lending risk. Furthermore, adverse selection may exist in rural credit markets, due to heterogeneous endowments of farmers' abilities.

But since the federal farm credit system was restricted to the agricultural sector, it could not adequately address the problem of diversification. As the years unfolded, it also became clear that these institutions had an inherent conflict of interest. The banks of the FCBS were owned by the borrowers, who were either farmers or farmer-owned cooperatives. Stock equity in these institutions could not be freely traded; in fact, it could be redeemed only by paying off loans. Furthermore, since dividends were not paid, the most effective means for transferring any residual was by charging below-market rates of interest which led, in turn, to too much borrowing. Once interest rates rose dramatically in the early 1980s, the federal credit system faced many of the same problems that plagued the U.S. savings and loan industry. Accordingly, farm credit interest rates rose above market rates. More efficient farmers exited the system, terminating their stockholder interest as they paid off their loans. Farmers who could not secure credit from other sources remained in the system.

Due in large part to these structural problems, the farm credit banking system suffered losses of over $2 billion per year in 1985 and 1986. As the losses mounted, lobbyists representing the FCBS spent millions of dollars arguing for subsidies. The federal government bailed out the FCBS in 1988. Whether or not the FCBS had originally aimed at a market failure, it had developed its own political momentum for taxpayer transfers to the farm sector.

Legislated Redistributive Activities

To this point, the discussion has emphasized policies that were justified to some degree by market imperfections, even if they were often manipulated for purposes of redistributing income to the farm sector. However, the institutional structure which emerged from the efficiency-enhancing legislation of the 19th century and early 20th century—the Morrill Act, USDA, Hatch Act, Smith-Lever Act, and so on—composed of the extension system of county agents, the U.S. Department of Agriculture, and generic farm groups, formed the foundation

for one of the best organized economic interest groups in the country. The agricultural depression of the 1920s, which foreshadowed the Great Depression, provided the stimulus for this coalition to be more cohesive and effective in redistributing benefits to farmers. Also, during this period, farm interests were able to avoid a number of governmental regulations through legislative exemptions from antitrust, labor, and tax legislation.[3]

The long history of redistributive agricultural policies began in earnest with the passage of the Agricultural Adjustment Act of 1933, which continues to be revised every four years or so. Following the *Hoosac Mills* decision of the Supreme Court in January 1936, these redistributive programs required voluntary participation and offered nonneutral transfer schemes linking government support directly to the amount produced. Since these programs were tied to specific commodities, the generic farmer organizations began to lose influence. In effect, commodity-based groups became the primary vehicle for political expression of farmer interests (Lowi, 1965). At the same time, the USDA began a transformation from an organization that focused largely on research and education to a more conventional government agency, managing programs which provide direct economic benefits to specific interests.

Initially, the major policy instruments for redistributing income to the farm sector were price supports and public storage. Price supports were implemented through government loans to farmers, where farmers put up a certain amount of a commodity as collateral for the period of the loan. If market price fell below the loan rate (price support), the government took ownership of the collateral; if not, the farmer could be expected to pay off the government loan and redeem the commodity. Of course, since price supports were generally set well above market equilibrium prices and since farm productivity was increasing sharply (in part, from the public investment in research), storage of the huge surpluses was a necessary by-product.

With the commodity redistributive policies came losses for consumers and taxpayers, gains to farmers, and deadweight losses, whose range has been estimated for many commodities on numerous occasions. Table 1 reports the figures for a representative year over the period 1985–1988. It is worth noting that the effects captured in the table underestimate total social losses; for example, they neglect the waste generated from rent-seeking behavior and the deadweight losses associated with tax collections. Furthermore, with the passage of the 1985 Food Security Act, the distribution of burden across consumers and taxpayers shifted dramatically in the mid-1980s and the net losses computed here fell relative to earlier periods.

[3]The Capper-Volstead Act of 1922 specifically exempted agricultural cooperatives from some features of the Sherman antitrust legislation, allowing farmers to join together to purchase inputs, to market their products, and even to agree on the amount of joint sales. For much of this century, farmers were exempt from minimum wage legislation. After World War II, farmers were the major beneficiaries of the "bracero" program, which allowed temporary employment of Mexican aliens. Special provisions in the U.S. tax codes for agriculture included cash accounting and many tax shelter incentives for specific agricultural investments.

Table 1

Range of Annual Domestic Welfare Gains and Losses from Support Programs Under the 1985 Food Security Act, 1985–1988

Crop	*Consumer Loss*	*Producer Gain*	*Taxpayer Cost*[a]	*Net Loss*
		billions of dollars		
Wheat	0.24–0.30	2.62–3.22	3.67–4.27	0.69–1.95
Corn	0.68–0.76	7.23–7.62	7.30–8.10	0.36–1.63
Cotton	0.19–0.21	1.20–1.46	1.40–1.60	0.13–0.61
Peanuts	0.36–0.40	0.29–0.35	0[b]	0.01–0.11
Dairy	1.80–2.90	1.50–2.20	1.13–1.72	0.73–3.12
Sugar[c]				
Case I	1.90–2.40	1.50–1.70	0[b]	0.20–0.90
Case II	1.35–1.55	1.15–1.25	0[b]	0.10–0.40
Tobacco	0.20–0.22	0.34–0.38	0[b]	(0.12)–(0.18)[d]

[a]Includes Commodity Credit Corporation expenses after cost recovery.
[b]These programs are run at no-net cost to the government.
[c]Case I assumes U.S. policies do not affect world sugar prices. Case II takes into account the fact that U.S. policies reduce world sugar prices. The value of sugar import restrictions to those exporters who have access to the U.S. market (that is, value of quota rents) is $250 million.
[d]The tobacco program is estimated to have a positive net domestic welfare gain. This is because of the large value of U.S. exports allowing domestic producers to extract surplus from foreign consumers.
Source: Computed estimates from unpublished U.S. Department of Agriculture data.

The stylized facts emerging from Table 1 (not only for the United States but other countries as well) can be summarized as follows: the redistribution of income to agriculture is greater the richer or the more industrialized the country; the higher the cost of production; the fewer the number of farmers, absolutely and relative to the total population; the more price inelastic the supply or demand function; the lower the portion of total consumer budget spent on food; and the smaller on world markets the exporting country or the larger the importing country (Rausser and de Gorter, 1989). The efficiency of redistribution increases as either the demand or supply function becomes less elastic. Moreover, as Gardner (1983, p. 233) has shown, "The efficient method of intervention depends on which function is less elastic. Inelastic demand favors production controls, and inelastic supply a deficiency payment approach."

Policy Instruments

There are many margins for adjusting behavior. Since the 1930s, attempts to address these adjustments have resulted in a piecemeal proliferation of policy instruments. On the supply side, this includes the land controls and land conservation mentioned earlier, along with production quotas; and on the

demand side, it includes export subsidies and enhancements, concessional foreign sales and food grants, and food stamps. Unfortunately, each additional policy instrument brought its own unanticipated side effects, requiring still additional mechanisms.

Sometimes the side effects seem so obvious that policy-makers can only have missed them through sheer myopia. For example, the initial voluntary acreage-reduction programs focused on compliance requirements *for a particular commodity*, neglecting the fact that farmers might substitute and grow other crops, like soybeans rather than corn. In fact, it was sometimes possible for the party that had demanded the original crop to substitute and use the new crop the farmer was growing (Brandow, 1977). Of course, if too many restrictions on substitution are placed on farmers, they will choose not to participate.

To understand how farmers can respond to voluntary programs, it is important to describe the mechanics of the income transfers. For some years, the major vehicle for these transfers has been "deficiency payments." The government sets a target price for certain commodities. The target price is set well above the market price, which encourages high program participation. The deficiency payment rate is computed as the difference between the target price (set by law) and the higher of the price support or the average market price received over the first five months of the marketing year. Each farmer participating in the program has a payment base, determined by the land base (essentially how much land they have dedicated to the crop in the past) and "program yield" (based on the individual's or counties' past yields). The deficiency payment rate times the payment base, adjusted for acreage set-aside requirements, determines the total deficiency payment.[4] Thus, the amount of deficiency payments to farmers is influenced through four different channels: target prices, price supports, the land resource base, and productivity.

To receive the deficiency payments, participating farmers must either allocate land to a crop in the program or to conservation uses dictated by the Department of Agriculture. Moreover, until 1990, the enabling legislation has generally required farmers to forego present and future program benefits if they harvest crops other than the program crop for which they have a "land base." This feature was intended to prevent a farmer from collecting federal subsidies for not growing one crop, while growing another. It also has the effect of coupling income transfers to the planting and harvesting of program crops. Historically, one of the major barriers to entry in program crop production has been land bases on which acreage restrictions are imposed (Becker, 1985).

[4]Specifically, for those who participate, the expected deficiency payment for a particular crop, c,

$$E(d_{ct}) = \left[P_{ct}^{T} - Max\left(P_{ct}^{S}, E(P_{ct})\right)\right](1 - \omega_{ct})L_{ct}Y_{ct}$$

where P_{ct}^{T} is the target price; P_{ct}^{S}, the support price; $E(P_{ct})$, the expected average price received by farmers; ω_{ct}, the percentage of land base required to be idled; L_{ct}, the land base in period t; and Y_{ct}, the program yield per unit of the land base.

Over the years, more flexibility has slowly been introduced and the amount transferred has become increasingly less dependent on the actions, current and past, of farmers. For example, until the 1986 market year, the expected program yield was determined as a moving average of a farmer's past yields. One provision of legislation in 1985, however, was to assign unalterable program yields. Thus, a farmer could no longer strategically influence this variable.

The incentive to raise production caused by price supports was also dramatically reduced with the 1985 legislation. The Secretary of Agriculture was given discretion in the case of feedgrains and wheat to lower the price support up to 20 percent below the basic loan rate. For soybeans, the loan rate can be lowered no more than 5 percent. For cotton and rice, the effective loan rate is set at world market prices. As a result, cotton and rice farmers participating in government programs could first pledge their output as collateral for a loan at the basic rate and, at maturity, repay the loan at the prevailing world market price if it is lower than the basic rate.

In the case of land base, however, current actions can still influence how a farmer's base is computed.[5] A producer of a program crop has an assigned "base" acreage of that crop, which is derived from a five-year moving average of plantings of that crop on the farm. As a result, a forward-looking farmer may plant larger acreage in anticipation of future subsidies.

The trend toward lowering entry barriers to production of program crops and the degree of coupling at the margin was continued in the 1990 farm legislation. In comparison to previous legislation, the flexibility provisions allow market signals to play a more significant role in guiding production decisions. These provisions permit 15 percent of the land base to be planted to any program, any oil seed, any industrial, experimental, or any other nonprogram crop except for fruits and vegetables.[6] This 15 percent of the total base is not eligible for support payments, but program crops, other permitted crops, or conservation uses are allowed.

In addition to the above 15 percent "normal flex" provision, farmers are also allowed the option of an additional 10 percent flexibility. Subsidy payments are lost on these acres as well as the 15 percent "normal" flex acres; but for both the "normal flex" and "optional flex" acres, the land base is protected. Prior to 1990, the allocation of land to any nonprogram or other program

[5]The land base for each producer is established at the county office of the Agricultural Stabilization and Conservation Service (ASCS). The ASCS is the administrative agency within the U.S. Department of Agriculture that has responsibility for implementation of the deficiency payments. It has an office in each state and 3,000 county offices nationwide. In addition to several thousand employees, a local committee of three persons (usually producers) handles local appeals of decisions and other administrative matters. County offices assign each local producer a program yield as well as a land base.

[6]The latter barrier to entry is a reflection of the political influence of California fruit and vegetable growers.

crops would have reduced by an equivalent amount that acreage that would enter the 5-year moving average process for determining land base.

That portion of the actual land base that is idled can be decided by each producer, and each producer will rationally idle the least-productive land (whether the control comes through owner or renter status). This option, along with reconfigured variable inputs on the utilized land (plus the existence of nonparticipants) means that a program which seeks to reduce acreage by a given percent normally reduces output by a substantially smaller percentage. This phenomenon of increased per-acre yields associated with government acreage control programs has been referred to as "slippage."[7] Estimates of the amount of slippage range from 30 percent to as high as 60 percent (Norton, 1986; Love and Foster, 1990; Ericksen, 1986).

Given the possibilities for manipulating output patterns, it follows that predicting government agricultural spending is highly uncertain. Since the target price is set by the legislation, the major sources of uncertainty are the support price, the land base, and the number of farmers who choose to participate.[8] Indeed, the OMB and the USDA frequently generate point forecasts for government expenditures which are widely off the mark. However, it is notable that, compared to other budgetary predictions, predictions of agricultural expenditures have been systematically biased downward over the last few decades. One explanation is that there are strong incentives for underestimating expected Treasury costs in an area where the transfer recipients are distinctly more powerful and better informed than those who share the burden for the transfers (taxpayers and consumers).

In an attempt to control government spending, as well as to address goals of distributional equity, deficiency payments are limited to $50,000 per farm. Over the years, however, many loopholes have allowed these payment limitations to be exceeded. The loose definition of a "person" has fostered overlapping partnerships and other methods of farm ownership that qualify for multiple payment limits. Accordingly, the number of "farmers" in program-eligible commodities has increased over the last decade, while the number of farmers producing commodities ineligible for subsidies has declined.

Despite these attempted limitations, the distribution of program benefits continues to be viewed by many as inequitable. For the 1988 crop year, operating farms with sales above $100,000 received 57.6 percent of the direct government payments. As shown in Table 2, the cumulative distribution of government payments reveals concentration among the largest farming operations, with the average payment to all farmers having annual sales exceeding $500,000 per year at approximately $40,000. Since many large farms do not

[7]The slippage rate is defined by $s = -[(\Delta Y/Y)(\Pi/\Delta\Pi)]$ where Y is aggregate per-acre yield and Π is the ratio of land planted to total land, planted and diverted, for that crop.

[8]Prior to 1986, the level of productivity used in the computation of deficiency payments was also uncertain over the planning horizon following each revision in the basic Agricultural Adjustment Acts of the 1930s.

Table 2
Distribution of All Government Payments by Farm Class, 1988
(all farms)

Farm Class (by annual sales)	*Number of Farms*	*Average Payment*	*Total Payments to Class*	*Total Payments*	*Total Farms in Class*
dollars	*thousands of farms*	*dollars*	*millions of dollars*	*percentage*	
< 10,000	1,051	559	588	4.1	47.8
10,000–19,999	270	2,368	640	4.4	12.3
20,000–39,999	253	5,821	1,472	10.2	11.5
40,000–99,999	300	11,461	3,444	23.8	13.7
100,000–249,999	220	21,452	4,714	32.6	10.0
250,000–499,999	67	32,484	2,188	15.1	3.1
500,000 >	35	40,874	1,435	9.9	1.6
Total	2,195	6,597	14,481	100.0	100.0

Source: U.S. Department of Agriculture. "Economic Indicators of the Farm Sector: National Financial Summary, 1989." ERS, ECIFS 902, Table 30, p. 46.

produce commodities eligible for government programs (approximately 25 percent of all farmland in the United States is eligible for government crop programs), participating farms receive considerably more than this figure. In fact, based upon sample surveys conducted by US Department of Agriculture, Economic Research Service, the estimates of payments to program-participating farms is $30,598 for the sales category of $100,000 to $249,000; $41,888 for the sales category $250,000 to $499,000; and $66,037 for the sales category above $500,000.

Implications of Coupled Transfers

Many of the inputs used in agricultural production are joint, producing valuable as well as undesirable outputs (Rausser, 1974; Rausser and Lapan, 1979). Encouraging agricultural production through coupled transfer schemes while requiring some land to be idled leads to excessive utilization of basic inputs. Residuals of excessive fertilizer and pesticide input applications combine with excess water and are transported into various water sources, an externality output. Toxic salts accumulate in agricultural land. Burning crop residues may result in air pollution. Wind erosion contributes to particulate air pollution and has been estimated to cost $4 billion or more in annual damages in the western United States, while erosion caused by water runoff has been a major contributor to water pollution resulting in damages estimated to range from $5 billion to $18 billion annually (Economic Report of the President, 1990).

The land that is allocated to production of program crops is combined with more pesticides and fertilizers than would otherwise be the case. Farmers receive subsidies only on that land that is part of the farmer's program crop base. Thus, a disincentive is created for rotating crops. Because crop rotation is a nonchemical technique for pest control, the coupled transfer programs aggravate pesticide pollution by encouraging the substitution of chemical for nonchemical pest control.[9]

In this respect, the experience of the United States is consistent with the rest of the world. Countries which tax their agricultural sectors (Argentina, Thailand) use less than one-twentieth the amount of chemical fertilizer per cultivated acre that highly subsidized countries such as Switzerland use. There is a similar direct correspondence between producer subsidies and the use of farm pesticides (Anderson, 1992).

Given the relationship between coupled transfers and the determined land base, acreage that is suitable for the program crops becomes more valuable. These subsidized land values encourage farmers to allocate available land to program commodity production. In some instances, this has included land that is steeply sloped and thus highly erodible, as well as wetlands that provide important wildlife habitat. Hence, coupled transfers based on land use have created incentives for farmers to use land in ways that increase adverse environmental impacts. These concerns helped motivate the conservation reserve program of the 1985 legislation and the planning flexibility provisions of the 1990 farm legislation. These recent farm bills have established a trend toward reducing the linkages between agricultural subsidies and farmers' production and land-use decisions. Accordingly, potential adverse environmental spillovers have been slowly reduced.

The inflexible settings of price supports and target prices in the early 1980s followed the favorable agricultural economic markets of the 1970s. The coupled transfer policies augmented the degree of overexpansion within the U.S. agricultural sector, making the sector especially vulnerable to the unanticipated interest rate, exchange rate, and growth rate patterns of the early 1980s (Rausser, Chalfont, Love, and Stamoulis, 1986). One adverse environmental result was the "mining of the soil" that many farmers engaged in during the 1980s in order to survive financial stress (Foster and Rausser, 1991).

Partly because of the nature of the coupled transfers, one production record after another was broken during normal weather years of the 1980s. These high levels of production led to pressure for change. For example, in 1983, commodity-specific certificates were offered in lieu of cash transfers; that is, farmers were offered subsidy in kind rather than cash. This became a means for releasing public stocks held in the farmer-owned reserve. In 1986, generic

[9]Due to the complex measurement problem that arises in the monitoring and estimating environmental bads, Pigovian taxes based on marginal damages are impractical (Rausser and Howitt, 1975). As a result, measurement or information policies must be put in place with environmental standards, taxes, or control policies (Hochman and Zilberman, 1978; Rausser and Lapan, 1979).

commodity certificates were introduced in place of commodity-specific certificates up to the level of available stocks. Governmental expenditures skyrocketed in 1986 because governmental stocks moved on to market through the generic certificate program, driving real prices to record lows for many commodities and thus indirectly increased the level of deficiency payments. As noted above, the 1985 Food Security Act also dramatically lowered price supports, computing their levels as a moving average of past market prices with some bounded discretion on the part of the Secretary of Agriculture to set the actual price support at lower levels.

A number of general equilibrium analyses have been conducted to estimate the intersectoral effects of coupled transfer policies on the balance of the U.S. economy. One study concluded that the misallocation of resources and capital to agriculture depressed the productivity of other sectors of the U.S. economy and reduced American manufacturing exports by $7.5 billion and service exports by $3.4 billion (Hertel, Thompson and Tsigas, 1989). Another study estimated that the removal of all programs which distort agricultural production or constrain input use would increase 1991 GNP by $9.6 billion (Robinson, Kilkenney and Adelman, 1989).

U.S. Agricultural Policies and the Rest of the World

Since the United States is a large producer of some commodities on the world market, its price supports and accumulation of stocks can conceivably result in short-run favorable consequences for all exporters of the commodity in question. Specifically, if the internal price supports are so high as to effectively eliminate the export market as a relevant alternative, all the benefits accrue to other exporting countries in the short run. Over much of the post-World War II period, the United States has behaved as a residual supplier on world markets of many major commodities, especially the food grains, cotton, and the feed grains.

To the extent that the price support programs and coupled subsidy transfers discussed above, as well as protection against import competition (such as quotas in the United States and variable levies in Europe) all induce greater production, however, world prices will be depressed. This is particularly evident when the U.S. government sells unwanted stocks on the world market at less than the domestic price (through the Export Enhancement Program), makes concessional sales, or simply donates the food as aid (through PL 480). These potential effects have been examined in a number of empirical analyses (Tyers and Anderson, 1986; Roningen and Dixit, 1989; Zietz and Valdez, 1986). For example, Roningen and Dixit estimate that eliminating U.S. agricultural policies would increase world dairy product prices by 23.5 percent, sugar by 22.8 percent, coarse grain by 11.6 percent, wheat by 10.6 percent, rice by 2.9 percent, ruminant meats by 3.8 percent, and nonruminant meats by 3

percent. This would lead to corresponding costs for consumers and benefits for producers in the rest of the world.

Anderson and Tyers (1990) estimate that multilateral liberalization of agricultural policy by all OECD countries would increase the world prices of dairy products by 90 percent, sugar by 22 percent, coarse grain by 3 percent, wheat by 25 percent, rice by 18 percent, ruminant meats by 43 percent, and nonruminant meats by 10 percent. While these price changes would result in costs for consumers and benefits for producers in the developing world, Anderson and Tyers estimate that the net welfare of developing countries would increase by 1 percent. Simultaneous policy liberalization by developing countries, however, would result in a net increase in developing country welfare of up to 64 percent.

One justification often expressed in support of price floors and public storage programs in the United States and in other industrialized countries is that they stabilize what would otherwise be an unacceptable domestic volatility in basic commodity prices, at least over the very short run.[10] Ironically, these same policies amplify rather than dampen commodity price fluctuations on international markets. One glaring example of this phenomenon is the world sugar market. The European Community (EC) and the United States both protect their domestic sugar producers—for example, in the United States through price supports, tariffs, and import quotas. These policies have been estimated to have increased price instability in the residual world market for sugar by approximately 25 percent (World Bank, 1986). Moreover, because the United States has been dominant in the world sugar trade, the imposition of import quotas has lowered world sugar prices.

Not surprisingly, European and U.S. sugar policies have also placed significant burdens of adjustment on many developing countries. The 1986 *World Development Report* estimated that sugar policies of industrialized countries cost developing countries about $7.4 billion in lost export revenues during 1983 and reduced their real incomes by about $2.1 billion. Given the domestic supply response to sugar and other substitutable products, even those developing countries who currently benefit can expect their quote levels, and thus values, to slowly vanish. In the case of world wheat prices, Schiff (1985) has estimated that the variability could be reduced by 48 percent if all countries were to end their subsidization of wheat. Tyers and Anderson (1986), using a model simulating policy reform in more than a half dozen commodity markets, calculated that liberalization of agricultural policies of industrialized countries would substantially reduce the international price variability of major temperate-zone commodities: wheat by 33 percent, coarse grains by 10 percent, rice by 19 percent, sugar by 15 percent, and dairy products by 56 percent.

[10]Stabilizing prices is, of course, not equivalent to stabilizing incomes. As noted by Newbery and Stiglitz (1981), stabilizing prices may actually increase income variability.

Table 3
Productive Versus Predatory Policy Interventions in U.S. Agriculture, 1982–1986 Average (*percentage unit values*)

	Producer Subsidy Equivalents		
	Total	*Productive (PERT)*	*Predatory (PEST)*
Sugar	77.4	7.9	92.1
Milk	53.9	7.8	92.2
Rice	45.0	6.4	93.6
Wheat	36.5	13.5	86.5
Sorghum	31.5	14.5	85.5
Barley	28.8	20.9	79.1
Corn	27.1	17.7	82.3
Oats	7.6	61.6	38.4
Soybeans	8.5	74.3	25.7
Beef	8.7	55.5	44.5
Poultry	8.3	65.0	35.0
Pork	5.8	82.5	17.6
Average	24.6	35.6	64.4

Source: U.S. Department of Agriculture, "Estimates of Producer and Consumer Equivalents: Government Intervention in Agriculture." Economic Research Service, ATAD Staff Report No. AGES 880127, April 1988.

Accounting for Predatory and Productive Policies

One measure of the degree of government intervention across commodity groups can be represented as a "producer subsidy equivalent" (PSE), the ratio of the total value of all public sector assistance to total farmer receipts. As shown in Table 3, the degree of government involvement is most dramatic for products where demand is inelastic, like sugar, milk, rice, and wheat. Feed grains have an intermediate level of support while sectors with more elastic demands, such as soybeans and red meats, have the lowest level of support.[11]

The decomposition of the public sector assistance into productive (PERT) and predatory (PEST) forms of government policy is also reported in Table 3. The productive category includes all expenditures by the public sector that are expected to lower transaction costs and enhance the rate of economic growth, namely public good expenditures, information and marketing services, grades

[11]For a survey of own-price elasticity estimates, see de Gorter, Nielson, and Rausser (1992). At the farm level, the most demand-inelastic commodities are sugar, milk, and rice; those commodities with intermediate degrees of demand-price inelasticity are wheat, sorghum, barley, corn, and oats; and finally, those that have the least degree of inelasticity and, in some instances, elastic demand functions, include soybeans, beef, poultry, and pork.

and standards inspections, crop insurance, public research, extension services, and so on. For the PEST category, all redistributive transfers from other segments of the economy to agricultural producers are incorporated, including deficiency payments, price supports, trade barriers, storage subsidies, input subsidies, subsidized credit, and so on.

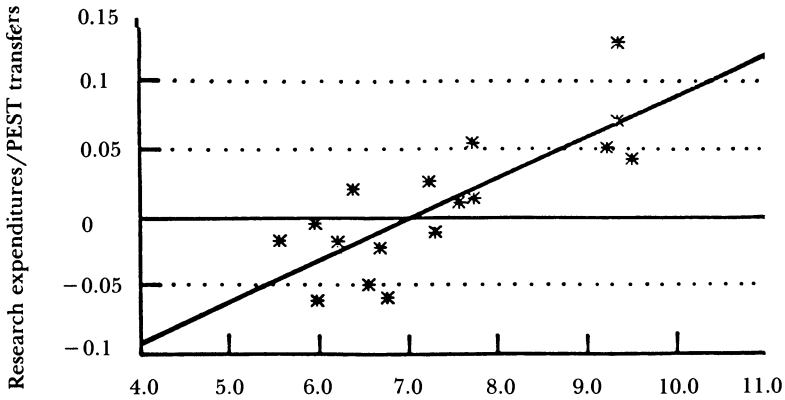
Note that the products with inelastic demands (sugar, milk, and rice) receive a lower proportion of their public support in the form of productive policies, while the products with elastic demand (soybeans and meats) receive a higher proportion of their support in the form of productive policies. The data is consistent with the view that coupled predatory policies are higher in sectors where demand is inelastic and where supply is very responsive to policies and lower in sectors with highly elastic demand and low supply elasticities. As noted earlier, redistribution efficiency would argue for low supply elasticities but here the joint determination of PESTs and PERTs places more weight on policy-induced supply expansion. For some products that do not appear in Table 3—for example, specialty perennial crops like oranges, lemons and grapes—whose demand is highly elastic, but whose productivity and supply response is low, coupled predatory policies do not generally exist. Instead, for these specialty crops, producer organizations tax their members to finance the provision of local public goods (de Gorter, Nielson, and Rausser, 1992).

For the case of public good investments and predatory coupled transfers, it has been shown that, if a productivity-enhancing policy harms producers because of highly inelastic demand and responsive supply, but producers have more political clout than other interest groups, the amount of public-good investment will be inadequate (de Gorter, Nielson, and Rausser, 1992). However, the political obstruction to public good investments can be countered with subsidies that are tied to production, thus leading to less underinvestment in public goods than would otherwise be the case. In effect, since productive policies may harm members of special interest groups, compensation through predatory subsidies may offer a means of making the pursuit of the public interest politically viable (Rausser and Foster, 1990). Transfers that seem only predatory at first glance may, in certain cases, actually be politically necessary if society is to approach the optimal configuration of productive policies.[12]

Even if demand is elastic and the "representative" producer benefits from the dissemination of an advance, producers are likely to be heterogeneous in their adoption of new technology. Those producers who make the greatest use

[12]Political influence also operates through the public sector by frequently slowing down the redistribution of income generated by changing market conditions. Accordingly, markets with highly inelastic demand and supply conditions as well as changing technologies are those markets which generate rapidly fluctuating incomes and thus a demand for public sector "stabilization." In a world of limited knowledge of how economic systems operate, producer-interest groups have successfully argued that "price stabilization" programs are in the public interest. In this instance, interests who share the burden of financing such programs are led to believe that such policies are PERTs.

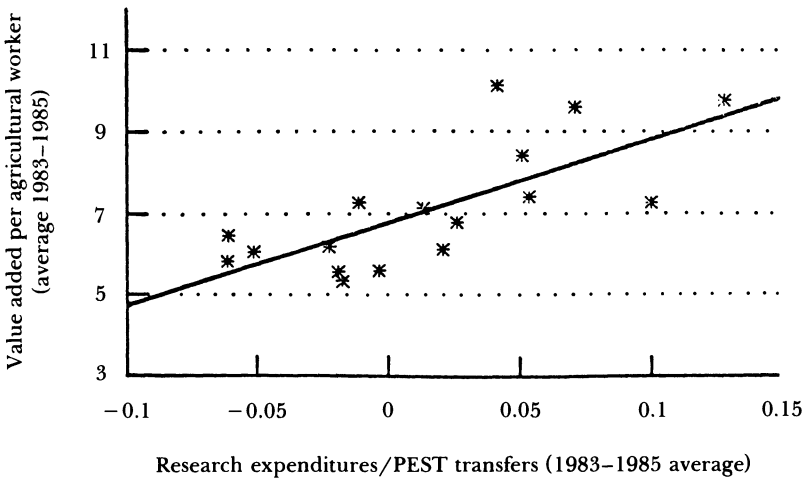
Figure 1
Research Expenditures / PEST Transfers Versus Per Capita Gross National Product



of the new technology will gain from its dissemination and the associated equilibrium price decrease, while others who make little or no use of the technology are likely to lose. Indeed, nonadopters always lose when the demand curve is anything less than perfectly elastic. In this setting, the key is not the elasticity of demand, but the heterogeneity of producers in their ability to take advantage of technical advances. If a sufficient number of these heterogeneous producers are harmed by the equilibrium effects of technological changes, then potential political impediments to future technical advances may arise. If so, some promise of wealth transfers from the winning consumers and taxpayers to the losing producers will be necessary to have any advance at all. As shown in Foster and Rausser (1992), wealth transfers tied to output may be a more effective means than per-firm lump-sum payments in inducing defection from the coalition of those producers least harmed by the technical change. Price-distorting payments target producers who, although harmed by the technology dissemination policy alone, expand their production the most.

A recent study supporting this perspective has examined PEST transfers and PERT investments in agricultural research for 23 countries. The evidence is revealed in Figure 1, which shows that the ratio of PERT to PEST transfers unambiguously increases with country income levels. In Figure 2, productivity measured by value added per agricultural worker is related to the mix of PEST and PERT expenditures. This suggests that one reason for the record of strong productivity growth in developed country agriculture is that, despite a strong tendency toward increased protection, there is a complementary tendency toward support for agricultural research. As Lee and Rausser (1991) note, complementary provision of PEST and PERT policies provides a consistent

Figure 2
Value Added Per Agricultural Worker Versus Research Expenditure / PEST Transfers



explanation for the distinctly different patterns found in developed versus developing countries. Developed countries typically protect their agricultural sectors while investing more in agricultural research and generating higher levels of agricultural productivity, while developing countries typically tax their agricultural sectors, invest little in agricultural research, and experience generally low levels of agricultural productivity.

The Search for Politically Robust Reform

Far too frequently, the economics profession has examined PEST policies as though they were separate from other policies, explaining their existence by the relative influence of interest groups or the opacity of the policy impacts. For the U.S. agricultural sector, however, one of the major messages is that policies can be packaged so vested interests may acquiesce to one policy in exchange for another. This observation applies not only to U.S. agricultural policy, but to all types of public-sector activities; for example, privatization with safeguards for some social groups in formerly command economies, urban planning and the granting of zoning variances in exchange for the supply of local public goods, and special worker adjustment compensation for industries facing increased international competition.

The challenge for economists in agricultural policy, as in other areas, is to identify policy reforms that make economic sense and are politically robust. In the past, the best the economic literature has been able to offer in the design of

democratic decision-making frameworks is to *separate* the processes for productive and predatory policies. Long ago, Wicksell (1896 [1967]) recognized the distinction between these types of policies and argued for organizing government so that the provision of the two types of policies would be decided by separate and qualitatively different processes. Mueller (1989), in his recent survey of the literature, outlines the conceptual and practical advantages of considering the two types of policies separately.

However, whatever the issues of analytical convenience, it is now being recognized that political and economic forces must be jointly considered in matters of both design and implementation of public policies (Rausser, 1982). Much recent investigation has been devoted to theoretical and empirical models of public sector decision-making in an attempt to accomplish this task. Readers interested in these issues from a general perspective might begin with Becker (1983, 1985); Peltzman (1976); and Zusman (1976). Those interested in applications to agricultural policy in particular might begin with Gardner (1987); Rausser and de Gorter (1989); Foster and Rausser (1992); and de Gorter, Nielson, and Rausser (1992). The purpose of the latter models is to explore ways in which PERT and PEST policies are jointly determined.

Economists have only begun to scratch the surface in the development of operational frameworks for blending productive and rent-seeking policies. In general, work in this area must recognize that these two types of policies go hand in hand; frequently, predatory policies are offered as compensation to those that are harmed as a result of the implementation of productive policies. Just as frequently, productive, or what may only appear to be PERT policies are structured to mask the redistributive mechanisms put in place by predatory or PEST policies, for example conservation and commodity subsidies, food security and self-sufficiency, instability and subsidized public storage, and so on. Furthermore, PERT policies with concentrated benefits but widely shared cost profiles naturally evolve into PEST policies, especially where the power of the few is alive and well and/or vested interests are relatively homogeneous. This means, of course, that the political-economic costs of removing policy distortions can be dramatically different from the cost of their original implementation. These asymmetric costs can result in policy irreversibilities, a consequence that is generally swept aside when the original policy intervention is evaluated. Finally, the special advantages offered to those groups seeking PEST transfers that face highly inelastic demand and supply relations must be tempered by the impact of PERTs on production possibility frontiers.

Operational prescription must recognize not only the economics of various policies, but also how the distribution of political power will affect the sequence of policy steps. The distribution of political power will often be critical in reforming policies to be more productive and less predatory (Rausser and Zusman, 1992). There will be situations where the political timing may be especially ripe, perhaps because of an economic crisis caused by outside factors, to change the institutional structure of agricultural programs. This was

certainly true in the mid-1980s when macroeconomic and international phenomena helped spawn a crisis in the U.S. agricultural sector. In the midst of this crisis, political entrepreneurship emerged which led to some governmental autonomy in the design of the 1985 Food Security Act as well as the subsequent 1990 Farm Act. The lowering of economic barriers and the enhanced planning flexibility introduced by these two pieces of legislation cannot be explained by the pure rent-seeking or predatory models of governmental intervention found in the literature.

Opportunities for restructuring the trade-off between the public and special interests have often appeared greatest during times of economic crises. However, the sustainability of the restructured tradeoffs and the new mix of productive and predatory policies has been shown time and time again to depend critically upon changes in the underlying institutional configuration. In the case of U.S. agricultural policy, an example of institutional changes that could alter the level and distribution of political power might arise from the current GATT negotiations. In the Uruguay round of the GATT negotiations, it was accepted early by all parties that distortionary trade policies in agriculture exist to rationalize internal country policies; thus, both sets of policies should be included in the negotiations. Accordingly, a number of proposals have been tabled in Geneva for reducing internal country coupled PEST policies and substituting PERT policies (Rausser, 1992). In the case of the U.S. government, this substitution process has been proposed to occur over a 10-year adjustment period. This means, of course, that the interest-group configuration after the completion of the GATT negotiations could be dramatically different than the political landscape that has existed over much of the prior 60 or so years. Agriculture will no longer be compartmentalized. Agricultural sector issues will be linked with other trade issues, thus widening the vested interests that will determine whether a GATT agricultural code is accepted or rejected. If the GATT agreement is accepted by the U.S. Congress, the executive branch will, no doubt, lean on the external code as a basis for credible commitments to achieving more PERTs in exchange for fewer PESTS.

In the grand scheme, the major policy issue is whether society can achieve more productive policies in exchange for fewer predatory ones. In the case of U.S. agriculture, even though the PERT/PEST balance over the last two centuries may be positive, as the years have unfolded it has become increasingly less so. Short of an external GATT agricultural code, the actual process of reversing this trend will depend upon those interests that have access to the policy-making process, the issues over which those interests can negotiate, the degree of consensus that is sufficient to complete negotiations, and the course if negotiations break down. For example, simply changing congressional seniority rules would significantly alter access power. Many of the commodities which enjoy the greatest amount of PEST transfers can be characterized as Southern crops. Changing the relative cost of organizing those who benefit from reforms

will increase their responsiveness to changes in their welfare. Creative packaging may also change the political technology by demonstrating the feasibility of alternative, more efficient programs of wealth transfer. Steps like these often require political entrepreneurship; leaders who become essential players by being part of any consensus or admissible coalition supporting reform. In the final analysis, designing mixes of agricultural policy to generate greater efficiency and improved equity will not be sustainable without altering the policy-making process.

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