AN ANALYSIS OF U.S. FARM INCOME POLICIES: HISTORICAL, MARKET-DETERMINED, AND SECTOR-WIDE STABILIZATION

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Abstract

This paper provides an economic analysis of the historical agricultural price and income support policy, a policy of market-determined prices and income, and a policy linking market-determined prices with sector-wide farm income stabilization in years of economic disaster. The analysis compares commodity prices, net farm income, and government expenditures over the period 1970 through 1982 based on estimates generated by USDA's Food and Agricultural Policy Simulator (FAPSIM). The historical policy generates the highest income and most stable prices. Market-determined income is lowest and has the greatest variability. Stabilization minimized income variability at intermediate income levels.

Key words: agricultural policy, price stabilization, income stabilization, decoupling.

The economic conditions of the U.S. agricultural sector since the 1970s reflect increased linkages between domestic and foreign agricultural and financial markets, and, therefore, reflect the condition of the general economy and shifts in fiscal and monetary policy. The discussion leading into the 1990 Farm Bill debate is shaped by the federal budget deficit, international trade negotiations, and traditional interests. Agricultural income policy options include maintaining the status quo, implementing strict supply control, deregulating markets, and unlinking or "decoupling" income support from commodity production and marketing decisions. Concerns about the federal budget deficit raise the possibility of alternative methods of financing agricultural stabilization programs. The objective of this paper is to provide a comparative economic analysis of: (1) the historical agricultural price and income policy which links support to farm production and marketing decisions; (2) a policy of market-determined prices and incomes; (3) a policy of stabilizing sector-wide agricultural income with externalized financing by general Treasury funds; and (4) a policy of stabilizing sector-wide agricultural income with internal financing through an ad valorem tax on agricultural commodities. The sector-wide income stabilization payments would be contingent upon aggregate net farm income falling short of the target level independent of any particular farmer's production and marketing decisions, and therefore "decouple" or unlink support from farm-level decision making.

AGRICULTURAL POLICIES

The four agricultural policies are discussed under the assumption that producers maximize the utility of income with respect to the mean and variance of income. This implies that producers allocate factors among enterprises so that marginal costs are equal to marginal revenues, where costs include any risk premium required by producers given their production and market environment. Similarly, consumers are assumed to maximize utility with respect to the level and variability of prices and incomes. Economic efficiency is maximized with perfectly competitive markets (including risk), and the market price paid by consumers is equal to the marginal and average revenues and costs (Newbery and Stiglitz, pp. 59–130).

Newbery and Stiglitz (p. 207) cite three key assumptions for a Pareto-efficient allocation: (1) individuals are price-takers; (2) there is a complete set of futures and risk markets; and (3) there are no externalities. They conclude that futures markets do not extend forward far enough and that most agricultural risk cannot be insured in an actuarially fair manner,

but that efficiency gains from price stabilization programs are likely to be small.

However, the continued cyclical behavior of the agricultural economy suggests the possible role for public institutions in stabilizing agricultural income. The expansion of U.S. grain exports in 1972 and 1973 resulted in higher prices and net farm income. Changing world market conditions and inflation-reducing monetary policy in the late 1970s worked in tandem to reduce U.S. agricultural exports, prices, and asset values (Orden). Low commodity prices and the debt on inflated assets led to the agricultural financial crisis of the mid-1980s (Duncan and Harrington; Melichar; and Johnson et al.).

The relationship of government intervention in stabilizing income to economic efficiency depends upon the source of its funding and its effects on marginal resource allocation. The increasing association of agricultural production with externalized environmental costs suggests that the economic relationship of key policy instruments to such costs be considered in policy analysis (Batie). In this study, externalized costs are addressed to the extent that they are associated with the funding and economic consequences of the agricultural income policies analyzed.

Historical Policy

The historical policy here is taken to encompass the price and income support programs that evolved from the Agricultural Adjustment Act of 1933 (AAA), the Agricultural Marketing Agreement Act of 1937 (AMAA), and the Agricultural Act of 1949 as amended and implemented since 1970 (Benedict; Cochrane and Ryan). Paralleling the cyclical agricultural economy during the 1980s were substantial changes in agricultural programs. Following declines in real net income, the 1981 Farm Bill generally increased support prices, thereby encouraging production and reducing U.S. access to export markets. Soon after came the 1983 Payment-in-Kind (PIK) and Dairy Diversion programs, costly and controversial voluntary production control programs. The Conservation Reserve Program (CRP) followed with the goal of removing 45 million acres of land from production. The 1985 Farm Bill implemented downward adjustments in support prices, export enhancements, and the Dairy Termination Program.

The historical support programs alter decision making by linking payments or benefits to production or marketings (Gardner, 1987a;

Heifner et al.; Ippolito and Masson). Wedges are driven between marginal revenues to producers and prices paid by consumers by: (1) deficiency payments made to participants in crop programs; and (2) classified pricing and revenue pooling associated with federal marketing orders. Production or marketing quotas reduce the quantities supplied on the market, driving a wedge between the price (marginal revenue) and marginal costs. To the extent that the rents created by programs are capitalized in the sale of assets, particularly land and production or marketing quotas, they become fixed costs to subsequent asset owners.

The relationship between historical farm programs and real net income support is tenuous because of increasing productivity and changing levels of real support relative to costs. Gardner (1987b) estimated that between 1934 and 1979 expected gains per revenue dollar that resulted from commodity programs ranged from 0 to 54 cents for grains, 0 to 74 cents for cotton, 0 to 30 cents for milk, and 33 to 82 cents for sugar. Historical programs, therefore, appear to have a role in creating financial instability to the extent that rents are capitalized and real levels of support vary in response to budgetary or other pressures.

Agricultural price and income support expenditures have been primarily financed by the Treasury and are externalized from the agricultural economy. However, in recent years, milk producers and tobacco farmers and buyers, among others, have been assessed to fund price and income support programs, internalizing a portion of support expenditures (USDA, 1988a and 1988b). Internalized program costs also include any program-generated higher prices paid by consumers. Of increasing concern are external costs associated with agricultural pollution. Supported prices provide incentives to apply chemicals at higher rates and to bring marginal land into production. To the extent that additional chemical application is polluting and the additional cultivated land is environmentally sensitive and damaging, externalized pollution costs can be attributed to price supports.

Market-determined Income

"Market-determined" in this study is defined to be the absence of programs which are designed to regulate agricultural commodity prices or quantities. A policy of market-determined income under competitive conditions would provide incentives for producers to allocate resources so that marginal reve-

nues for each commodity would equal marginal costs, including a factor for risk and uncertainty. Over the long run, market forces would be expected to equalize commodity prices, marginal costs, and average total costs (including land rent). All costs of bearing risks would be internalized into the cost of providing food and fiber and the prices consumers pay.

Sector-wide Farm Income Stabilization

The farm income stabilization policies in this paper link market-determined prices and income with a sector-wide income stabilization program. The program is a variation of the "sector-wide tax-credit" income support program of Schertz and Clayton, drawing on previous work by Froker, and Working and Norton. The program is similar to the Western Grain Stabilization program established by Canada in 1976 (Spriggs). If national net farm income from eligible farming enterprises were to fall short of a target amount, a payment of uniform amount per dollar of reported eligible gross farm revenue would be available to each farmer. In this study, a three-year moving average of annual net farm income is used to set annual targets for stabilization.

Suppose that in a particular year the net farm income stabilization target was $30 billion, while poor economic conditions resulted in a market-determined net farm income of only $9 billion. For this case, there would be a total payment pool of $21 billion. This $21 billion would be distributed in equal portions for each dollar of eligible farm revenue across the entire sector. If market-generated farm revenues were $140 billion, total revenues would be $161 billion. Such a distribution would result in each dollar of eligible revenue being increased by a factor of 1.15 (1.15 = $161 / $140). Therefore, for each dollar of reported eligible revenues, $0.15 in producer payments would be generated.

Eligible farm revenues would include gross revenue from the sale of eligible commodities and any insurance indemnities associated with an eligible commodity. Thus, the policy would limit income risks of otherwise profitable producers in years of widespread income shortfall. Rules could be established for making early estimated or partial payments. Farmers with little or no eligible revenue resulting from uninsured production failures, management choices, or marginal resource bases would receive proportionally little or no benefits in years of stabilization.

Two stabilization policies are analyzed, one

with financing from general Treasury funds, the other funded by an ad valorem tax on the first sale of agricultural commodities. The policies include no supply controls, and assessments are currently collected to fund both price support and generic advertisement programs (Blisard and Blaylock). Therefore, it is presumed that an ad valorem tax or similar assessment could be written into law and meet the test of constitutionality as far as the 1936 Hoosac Mills case is concerned (Benedict; and Kelly and Harbison).

Marginal resource allocation under sector-wide income stabilization would depend on producer responses to market-determined prices and reduced income variation. Because of the ex post nature of the program, no decision could be made with assurance of payments in any given year. Each producer's share of the stabilization would be determined by his reported gross farm revenues, independent of any production or marketing decision concerning a particular enterprise. Therefore, it is expected that market-determined marginal resource allocation would not be significantly altered by sector-wide stabilization as far as relative commodity prices are concerned.

In years of income stabilization, the marginal utility of income would be high, and net farm income would be increased to its target level, thereby maintaining the sector's financial stability. Stabilizing net farm income at a fraction of its moving average would provide insurance for a portion of aggregate average variable costs without creating a rent, and allow the target to adjust as general revenue and cost levels change. During successive years of significant net farm income decline, sector-wide stabilization would slow the rates of decline in producers' incomes and the flow of unprofitable resources onto the market. The reduction in aggregate agricultural financial risk would place downward pressure on interest rates on agricultural loans from purely market-determined levels. Thus, it appears that most resource allocation changes accompanying the stabilization of market-determined income would result from producers' responses to reduced financial risk.

Financing the stabilization program with general Treasury funds would be independent of decisions pertaining to commodities and would externalize the costs from the sector. Alternatively, an ad valorem tax levied on the first sale of agricultural commodities would affect commodity consumption and production at the margin, driving a wedge between the

prices paid by consumers and received by producers. To the extent that targeted tax revenues were used to stabilize income, the costs of bearing uninsurable risks would be internalized. The incidence of the tax would depend on the matrix of supply and demand elasticities and the tax rates and would apply only to the farm value (less than 30 percent) of total food expenditures (Dunham).

POLICY SIMULATION

In this study, a dynamic economic analysis of the four policies on the major U.S. livestock and grain subsectors is made using the Food and Agricultural Policy Simulator (FAPSIM), a partial equilibrium model maintained by USDA. The period from 1970 to 1982 was chosen for analysis because of the relative stability of agricultural policy and programs and the variety of economic conditions during the period. Relatively high surpluses and CCC expenditures existed prior to 1973, when grain exports expanded. From 1973 through 1982, net farm income fluctuated along a downward trend.

Overview of FAPSIM

While FAPSIM is documented elsewhere, a brief overview of FAPSIM is provided (Salathe et al., 1982 and 1983). The model comprises crop and livestock subsectors, for which prices, production, consumption, exports, and stock levels can be endogenously solved under a variety of farm policy options and subject to exogenous variables. The livestock component includes beef, dairy, pork, poultry, and eggs. Dairy program variables include the support price and the classified pricing and revenue pooling provisions under marketing orders. The crops include corn, oats, barley, grain sorghum, wheat, soybeans, and cotton. Acreages planted by participants and non-participants in government programs are functions of loan rates, expected market prices, target prices, variable costs, expected and national program yields, set-aside requirements, and diversion payments. Yields per harvested acre are functions of acreages planted and set-aside, weather, and the ratio of lagged crop price to the fertilizer price index. Commercial stocks are solved simultaneously with prices and quantities supplied and demanded. The decision rules governing farmer-owned reserve and government stock levels are incorporated.

The supply and demand functions, estimated from historical price and quantity data, reflect the effects of the historical programs on risk

and producer and consumer responses to it. Thus, the effects of policy changes in the area of risk cannot be fully simulated. The model can, however, provide a first approximation of the results of moving to a policy of market-determined or stabilized farm income.

Simulation Procedures

Analysis of the four policies requires the use of simulations with FAPSIM and the use of additional calculations in the case of the sector-wide stabilization policies. Simulation procedures for each policy from 1970 through 1982 follow.

I. *Historical*: The historical policy is simulated by FAPSIM with the specific program and income support parameters as they existed from 1970 through 1982.

II. *Market-determined*: The market-determined income policy is simulated with FAPSIM by (1) removing all income and price support mechanisms, including supply controls, and (2) isolating all stocks owned by the government from the market beginning in 1970.

III. *Sector-wide stabilization, Treasury funded*: First, the market-determined FAPSIM simulation (II) is used to generate the basic quantities, prices, and income. Second, the sector-wide stabilization rules are applied to the FAPSIM market-determined income to generate stabilized income.

IV. *Sector-wide stabilization, ad valorem tax funded*: First, the market-determined FAPSIM simulation (II) is further modified to include the ad valorem tax and used to generate the basic quantities, prices, and income. Second, the sector-wide stabilization rules are applied to the FAPSIM market-determined income to generate stabilized income.

The sector-wide stabilization portions of the analysis are conducted by comparing net farm income as generated by the FAPSIM simulations against the target level of net farm income. Six target levels are analyzed, ranging from 75 percent to 100 percent of a three-year moving average of market-determined net farm income. These stabilization levels are referred to by their respective target percentages of the moving average (e.g., the 85-percent stabilization target level). Stabilization payments are calculated as the positive difference between simulated net farm income and the target. The use of FAPSIM in this analysis is equivalent to assuming that com-

modities within FAPSIM are those generating eligible farm revenue.

Simulation of the ad valorem tax with FAPSIM is accomplished by rotating each supply function to the left, increasing the slopes by the ad valorem tax rates (Henderson and Quandt). A basic ad valorem tax is imposed at the first-handler level on primary agricultural commodities and is adjusted downward for animal products to reflect the purchase of feed. Preliminary calculations indicated that a basic tax rate of 3 percent would generate revenues approximating the historical level of expenditures on price and income support. The basic 3-percent tax was multiplied by the following factors reflecting the proportion of production costs attributed to purchased feed, yielding lower rates for the animal enterprises (Somwaru):

1) cattle and hogs, 0.76, yielding a 2.3-percent tax;
2) dairy, 0.76, yielding a 2.3-percent tax; and
3) poultry and eggs, 0.44, yielding a 1.3-percent tax.

This FAPSIM simulation generates the basic market-determined net farm income to be stabilized with ad valorem tax funding (IV). The absolute tax for each commodity unit is calculated as the rate times the first-handler price. Total tax revenues are calculated as the aggregation of each commodity quantity times its absolute tax.

RESULTS

Presented first are the comparisons of aggregate farm incomes and transfers under the policies. These are followed by comparisons of the effects on quantities and prices of selected commodities and the effects on consumers. Throughout the discussion, all variables incorporating prices are presented in 1982 dollars, using the GNP implicit price deflator for conversion.

Simulated Net Farm Income and Transfers

Comparisons of the policies indicate that market-determined net farm income (II) is lowest and most variable among the policies analyzed. The historical policy (I) generates the highest net farm income with less variability than market-determined income. The sector-wide stabilization policies (III and IV) generate the lowest income variabilities over net farm income levels ranging from below the market-determined (II) to nearly the historical (I) levels. The variability of income under each policy is measured by the coefficient of variation (c.v.) of net farm income, defined as the standard deviation divided by the mean.

A dynamic comparison of the policies is made with sector-wide stabilization at the 90-percent target level under both Treasury (III) and ad valorem tax (IV) financing. Annual net farm incomes for the four policies are given in Table 1 and graphed in Figure 1. The transfers associated with each policy are given in Table 2. Payments to producers average about $3 billion under the three policies making payments and therefore allow a common basis for comparison. The operation of the stabilization policies is most easily illustrated by comparing market-determined income (II) with Treasury-funded income stabilization

TABLE 1. ANNUAL SIMULATED NET FARM INCOMES, 1970–1982, 1982 DOLLARS, BY POLICY[a]

	I	II	III	IV
	———————————— Billion Dollars———————————			
1970	34.99	33.99	33.99	31.05
1971	35.77	34.65	34.65	32.13
1972	39.78	29.16	29.34	26.75
1973	56.71	43.65	43.65	40.69
1974	38.29	35.68	35.68	32.89
1975	40.21	38.68	38.68	35.74
1976	32.60	29.36	35.40	32.80
1977	29.62	26.70	31.11	28.56
1978	43.24	37.10	37.10	34.34
1979	38.83	30.79	30.79	27.96
1980	25.11	18.73	28.38	25.96
1981	30.34	25.83	25.99	23.49
1982	19.83	3.19	22.61	20.22
mean	35.79	29.81	32.87	30.20
total	465.30	387.50	427.37	392.58
c.v.	0.25	0.34	0.17	0.18

[a] Policy definitions: I, Historical; II, Market-determined; III, Sector-wide stabilization, 90-percent target level, Treasury funding; IV, Sector-wide stabilization, 90-percent target level, ad valorem tax funding.

TABLE 2. ANNUAL SIMULATED TRANSFERS, 1970–1982, 1982 DOLLARS BY POLICY[a]

	Payments				Tax
	I	II	III	IV	IV
			—Billion Dollars—		
1970	4.32	0.00	0.00	0.00	3.84
1971	8.54	0.00	0.00	0.00	3.41
1972	5.42	0.00	0.18	0.00	3.36
1973	0.43	0.00	0.00	0.00	4.45
1974	0.44	0.00	0.00	0.00	4.01
1975	0.65	0.00	0.00	0.00	3.62
1976	0.35	0.00	6.04	6.21	3.36
1977	3.88	0.00	4.41	4.33	2.90
1978	2.44	0.00	0.00	0.00	2.87
1979	1.46	0.00	0.00	0.00	2.85
1980	1.92	0.00	9.65	9.94	2.52
1981	3.81	0.00	0.16	0.08	1.95
1982	4.88	0.00	19.42	18.50	1.38
mean	2.96	0.00	3.47	3.01	3.12
total	38.50	0.00	39.86	39.08	40.50
c.v.	0.83	0.00	1.98	1.87	0.34

[a] Policy definitions: I, Historical; II, Market-determined; III, Sector-wide stabilization, 90-percent target level, Treasury funding; IV, Sector-wide stabilization, 90-percent target level, ad valorem tax funding.

(III). Stabilized income is equal to market-determined income except in years when net farm income does not exceed 90 percent of the three-year moving average and payments are made in the amounts of the difference. Stabilized income funded by the ad valorem tax (IV) is calculated the same way, except the base income includes the effects of the tax. The average net farm income reduction of $2.62 billion caused by the tax is calculated by comparing mean market determined income (II) in Table 1, with mean stabilized income (IV) less its stabilization payments from Table 2 ($29.81-($30.20-$3.01)). Implementing the ad valorem tax generated an average $3.12 billion in revenues (Table 2). The implication is that about 84 percent ((2.62/3.12)(100)) of the tax incidence falls on the producers. However, producers receive 100 percent of the benefits paid for by the tax.

The graphical comparison of net incomes in Figure 1 clearly illustrates the effects of the policies on the level and variability of net farm income. Historical income (I) lies above market-determined income (II) in all years. The stabilizing effect of the historical policy is most apparent in 1972, when market-determined income declined and historical income increased. Following 1972, however, the historical and market-determined paths are roughly parallel. Payments made under both sector-wide policies (III and IV) stabilize net farm income in 1976 and 1977, and in 1980 and 1982, years following peaks, at levels exceeding both market-determined and historical levels. The historical policy provides peak levels

of income in the same years of peak market-determined income. Stabilization payments are made in years of relatively low income, while the historical payments are weighted more toward years of relatively high income.

The effects of the alternative income policies on the level and variability of net farm income, as compared against the historical policy (I), are given as follows:

(1) market-determined (II) would reduce income by 17 percent and increase income variability by 36 percent;

(2) stabilization (90-percent target level) with Treasury funding (III) would reduce income by 8 percent and reduce income variability by 32 percent; and

(3) stabilization (90-percent target level) with ad valorem tax funding (IV) would reduce income by 16 percent, reduce income variability by 28 percent, and would fully finance itself.

Thus, for approximately equal Treasury expenditures, either the historical policy (I) or the Treasury-funded stabilization policy (III) could be used to increase the level and reduce the variability of net farm income. The historical policy (I) provides higher income levels; the stabilization policy (II) provides lower income variability. At no cost to the Treasury, the market-determined policy (II) and stabilization funded by the ad valorem tax (IV) generate approximately the same income level, but market-determined income variability is nearly double that under income stabilization.

A comparison of the simulated net farm incomes generated by varying the stabilization target levels is shown in Table 3. As expected,
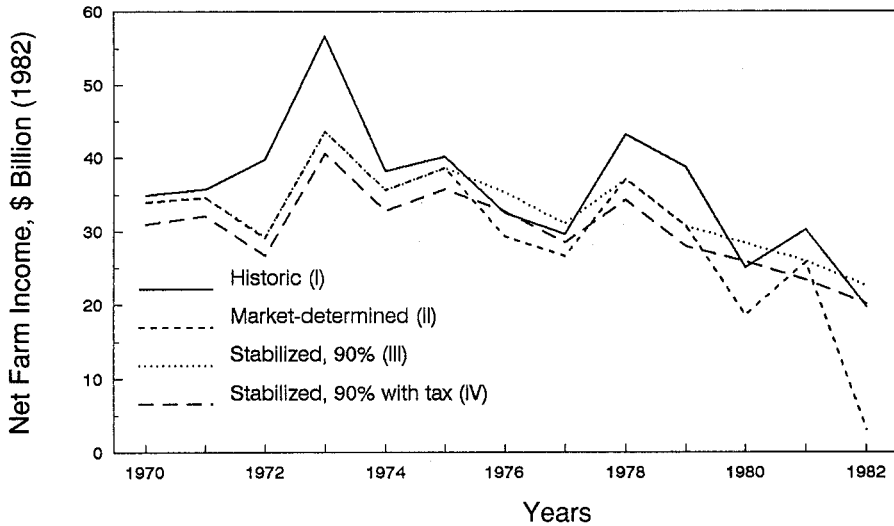
Figure 1. Simulated Net Farm Income 1970–1982.

as the stabilization target level increases, payment frequency increases, raising the average and reducing the variability of net farm income. Stabilization funded by the Treasury (III) at the 100-percent target level reaches 96 percent of the historical levels, but at an average Treasury outlay of $4.58 billion as compared to $2.96 under the historical policy. At the 75-percent stabilization target level, historical income variability reduction is achieved for about half the historical Treasury expenditures, but with net farm income reduced to about 88 percent of the historical level.

Sector-wide stabilization funded by the ad valorem tax (III) requires a target level of at least 85 percent to attain levels under the market-determined policy (II). Stabilization levels in excess of 90 percent would require sources of funds in addition to ad valorem tax revenues, while levels of less than 90 percent could be fully financed at lower tax rates or other uses could be found for the revenues.

Simulated Commodity Production and Prices

The effects of the four policies on commodity quantities and prices can be analyzed in three market categories. The historical prices and quantities reflect the historical price stabilization programs. The effects of the market-determined (II) and Treasury-funded sector-wide stabilization (III) policies on prices and quantities are identical. The effects of sector-wide stabilization funded by the ad valorem tax (IV) on prices and quantities reflect the effect of the tax on otherwise unregulated prices and quantities. The critical assumption is that stabilization payments have no effect on marginal resource allocation.

The most important factor in understanding the changes in prices and quantities is that land held out of production by the historical programs is released under all other policies, increasing feed grain and soybean production (Table 4). A slight decline in cotton acreage occurs with market-determined prices. A slight decline in wheat acreage occurs under the tax. Reductions in yields depended on changes in prices and the average acreages set-aside.

The average quantities and first-handler prices in Table 5 allow a more complete analysis. Without the historical price stabilization policies, average first-handler prices of soybeans, wheat, and cotton decline by 2 to 5 percent (II and III), and increase slightly with the imposition of the ad valorem tax (IV). The slight reductions in production under the ad valorem tax reflect that producers incur a share of the tax, resulting in reduced revenues.

The release of the set-aside corn acreage under the alternative policies and the livestock-feedgrain linkage complicate the interpretation of the results. Greater production and lower prices for feed grains under the market-determined and Treasury-funded stabilization policies (II and III) result in increased livestock, dairy, and poultry produc-

TABLE 3. SIMULATED NET FARM INCOMES, 1970–1982, 1982 DOLLARS, BY POLICY

Policy Simulation	Net Farm Income mean	Net Farm Income coef. of variation	Payments mean	Payments coef. of variation	Payment Frequency
	Billion Dollars				Years
I. Historical	35.79	0.25	2.96	0.34	13
II. Market-determined	29.81	0.34	n.a.	n.a.	0
III. Stabilization with Treasury funding Target level[a]					
75%	31.40	0.22	1.59	2.78	3
80%	31.84	0.20	2.04	2.37	4
85%	32.35	0.18	2.54	2.08	4
90%	32.87	0.17	3.07	1.98	6
95%	33.61	0.15	3.81	1.17	6
100%	34.38	0.14	4.58	1.49	9
IV. Stabilization with ad valorem tax funding Target level[b]					
75%	28.84	0.23	1.66	2.62	3
80%	29.26	0.21	2.08	2.26	4
85%	29.72	0.19	2.54	2.02	4
90%	30.20	0.18	3.01	1.87	5
95%	30.86	0.16	3.67	1.66	6
100%	31.59	0.15	4.40	1.49	8

[a] Target levels are percentages of moving-average market-determined net farm income.

[b] Target levels are percentages of moving-average market-determined net farm income, incorporating the ad valorem tax.

TABLE 4. SIMULATED AVERAGE PLANTED ACREAGE OF SELECTED CROPS, 1970–1982, BY POLICY[a]

	I	II and III	IV
	million acres		
Corn	78.3	82.8	83.0
Wheat	70.1	70.8	70.4
Soybeans	57.8	59.1	59.1
Cotton	12.8	12.6	12.6

[a] Policy definitions: I, Historical; II, Market-determined; III, Sector-wide stabilization, 90-percent target level, Treasury funding; IV, Sector-wide stabilization, 90-percent target level, ad valorem tax funding.

tion, which require price reductions of 3.5 to 6.5 percent to clear markets. Imposing the ad valorem tax (IV) results in slightly lower first-handler prices for both feed grains and animal products. The ad valorem tax on livestock products reduces livestock quantities and places upward pressure on first-handler prices. However, livestock quantities are reduced sufficiently to cause a leftward shift in the input demand for feed. The shift in feed demand coupled with the inelastic feedgrain supply function results in a feed grain price reduction of about 1 percent. This lower feed grain price results in a lower livestock production cost structure, shifting out the supply functions and generating quantities at about market-determined levels, and slightly lower prices.

The coefficients of variation on crop prices increase in the absence of the historical policy (I), with increases ranging from about 20 to 55 percent, while c.v.s for milk and beef prices increase marginally. Chicken and pork price variability is virtually constant across simulations. Thus, the stabilizing effect of the historical programs on crop prices is illustrated, as well as the stability of livestock prices under each of the policies.

Consumers at the retail level are marginally affected by the changes. However, the simulated mean all-food consumer price index (CPI) behaves as expected under the respective simulations. The all-food CPIs (1967=100) for each policy are as follows: (I) historical policy, 1.924; (II and III) market-determined and

Treasury-funded stabilization, 1.893; and (IV) stabilization funded by the ad valorem tax, 1.901.

Simulated Exports

Simulated exports of wheat, corn, soybeans, soybean meal, and cotton are shown in Table 6. As would be expected, export levels increase by 2 to 5 percent in the absence of the historical policy (I), with little change resulting from implementing the ad valorem tax (IV). The exception is cotton, with exports slightly higher under the historical policy. The major change in export variability is the 25-percent increase in the soybean export c.v. with the ad valorem tax imposed.

CONCLUSIONS

The analysis of the four agricultural policies provides some insight concerning their effects on net farm income level and stability, and resource allocation. The historical agricultural policy, through price stabilization and supply controls, both increases and stabilizes net farm income from market-determined levels, with the result that rents are built into the costs of production. Higher costs and prices, and supply controls reduce the competitiveness of the U.S. agricultural sector in world markets. Furthermore, the agricultural financial crisis of the mid-1980s raises questions concerning the effectiveness of the historical programs. However, there appears to be substantial support for public risk-bearing institutions to assist in stabilizing the agricultural sector.

Sector-wide farm income stabilization is a possible alternative public institution for bearing agricultural financial risk, taking on certain attributes of historical and market-determined income policies. The policy appears to be superior to the historical policy in reducing aggregate income variability while generating net farm income levels between the market-determined and historical levels. An otherwise competitive agricultural sector would be provided with financial stability in the event of widespread economic disaster, providing short-term protection against uncer-

TABLE 5. PRICE AND QUANTITY AVERAGES AND COEFFICIENTS OF VARIATION, SELECTED COMMODITIES, 1970–1982, 1982 DOLLARS, BY POLICY[a]

		Price[b]			Quantity		
		I	II, III	IV	I	II, III	IV
		— — — — dollars— — — —					
Corn[c]	mean	3.45	3.16	3.13	6351.76	6450.05	6448.85
	c.v.	.26	.39	.39	.20	.20	.20
Sorghum	mean	3.14	3.13	3.11	767.18	687.68	680.59
	c.v.	.25	.33	.33	.13	.19	.19
Barley	mean	3.07	2.64	2.61	415.00	432.79	432.94
	c.v.	.29	.54	.54	.13	.20	.20
Oats	mean	1.90	1.78	1.76	641.95	649.09	646.72
	c.v.	.24	.37	.37	.21	.23	.23
Soybeans	mean	8.52	8.07	8.10	1619.12	1660.41	1658.88
	c.v.	.23	.28	.27	.24	.27	.27
Wheat	mean	4.55	4.39	4.41	2013.12	1987.85	1976.16
	c.v.	.34	.45	.45	.22	.23	.23
Cotton[d]	mean	73.60	72.25	73.52	12.03	11.82	11.79
	c.v.	.20	.29	.29	.17	.23	.23
Milk[e]	mean	14.60	13.64	13.46	122.90	123.02	122.72
	c.v.	.08	.11	.10	.06	.05	.05
Beef	mean	73.15	70.34	69.28	22.53	22.98	22.90
	c.v.	.13	.15	.15	.04	.05	.05
Pork	mean	56.55	54.08	53.35	14.45	14.60	14.58
	c.v.	.22	.21	.21	.07	.08	.08
Chicken	mean	61.29	59.19	58.78	9.55	9.57	9.56
	c.v.	.16	.17	.17	.15	.15	.15

[a] Policy definitions: I, Historical; II, Market-determined; III, Sector-wide stabilization, 90-percent target level, Treasury funding; IV, Sector-wide stabilization, 90-percent target level, ad valorem tax funding.
[b] First-handler prices, including ad valorem tax where applicable.
[c] Corn, sorghum, oats, barley, soybean, and wheat prices are per bushel; quantities are million bushels.
[d] Cotton prices are per cwt.; quantities are million bales.
[e] Milk, beef, pork, and chicken prices are per cwt.; quantities are billion pounds.

TABLE 6. SIMULATED EXPORT VOLUMES OF WHEAT, CORN, SOYBEANS, AND SOYBEAN MEAL, 1970–1982, BY POLICY[a]

		I	II,III	IV
Wheat	total	15330.3	15853.6	15806.7
(million bushels)	mean	1179.3	1219.5	1215.9
	c.v.	.27	.31	.31
Corn	total	21063.9	22058.4	22141.2
(million bushels)	mean	1620.3	1696.8	1703.2
	c.v.	.36	.37	.37
Soybeans	total	8282.4	8428.6	8429.3
(million bushels)	mean	637.1	648.4	648.4
	c.v.	.29	.31	.39
Soybean meal	total	148167.7	152058.4	151793.9
(million pounds)	mean	11397.5	11696.8	11676.5
	c.v.	.23	.25	.25
Cotton	total	69.33	68.47	68.91
(million bales)	mean	5.33	5.30	5.27
	c.v.	.30	.34	.34

[a] Policy definitions: I, Historical; II, Market-determined; III, Sector-wide stabilization, 90-percent target level, Treasury funding; IV, Sector-wide stabilization, 90-percent target level, ad valorem tax funding.

tain events for which actuarially-sound insurance cannot be provided. The aggregate effects of sector-wide stabilization seem to be consistent with other programs that would stabilize income independent of commodity type and asset ownership, or "decouple" income support from commodities. Stabilizing both traditional and non-traditional agricultural income would enhance the ability of the agricultural industry to respond to changing domestic and foreign market conditions.

The possibility of expanding agricultural programs that are wholly or partially financed through taxes on commodities appears to warrant further research. Programs financed with assessments are in effect insulated from the general budget and its potential instability. In recent years, assessments have been used in the financing of generic promotion and price support programs for some commodities. Alternative uses for agricultural tax revenues could include transition assistance by paying off some proportion of farm debt, an improved farm enterprise insurance program, and the purchase of production rights on environmentally sensitive lands.

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