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IMPACT OF FEDERAL FISCAL-MONETARY POLICY ON FARM STRUCTURE

Luther Tweeten

This paper examines the impact of federal fiscal-monetary (FM) policy on farm structure. FM policy is multifaceted but is confined here mainly to policies influencing aggregate demand. Inflation is defined as an increase in the general price level. Farm structure refers to farm size and numbers, tenure, legal organization, investment, capital-labor ratio, productivity, and status (part-time or full-time farming).

The organization of this paper reflects that FM policy primarily impacts farm structure indirectly. The immediate or first-round impact on the farming industry is primarily through cost-price, cash flow, real wealth, and instability effects. I examine these first-round effects before analyzing their impacts on farm structure. The final section briefly reviews the influence of federal tax policies on farm structure.

FIRST-ROUND IMPACTS

Fiscal policy and monetary policy working in concert have created an inflation cycle. Stimulating the aggregate demand by increasing money supply and federal outlays and/or reducing taxes gives rise to the *expansionary phase* of the inflation cycle apparent in increased employment, income, inflation, and net imports. Contracting the aggregate demand by reducing money supply and federal spending and/or expanding taxes creates the *stabilization phase* of the inflation cycle apparent in reduced employment, income, inflation, and net imports. In general, impacts of FM policy can be analyzed by phases of the inflation cycle featuring these joint outcomes. Most of the subsequent analysis proceeds on that basis. However, in recent years fiscal policy and monetary policy working at cross-purposes have produced mixed outcomes, complicating the analysis of impacts. Fiscal-monetary policy will be treated briefly on an ad hoc basis.

Much of the following discussion is oriented to the expansion phase, but the arguments regarding cost-price, cash flow, real wealth, and instability are largely symmetric for the stabilization phase—if disinflation does not turn into deflation, pessimism into panic, and recession into depression.

Cost-Price Impacts

Prices throughout the economy do not change lock-step in response to expansionary fiscal-monetary policy. Imperfectly competitive sectors characterized by administered or negotiated prices might more quickly and fully pass inflated costs to other sectors than do atomistically competitive sectors such as farming. On the other hand, wage and other contracts in imperfectly competitive industries might cause prices charged by firms in such industries to rise more slowly than other prices. Inventories, biological restraints, supply and demand elasticities, and other factors also influence the relative and absolute response of prices by sector to an expansion in aggregate demand. Theory alone cannot predict relative price response by industry; the issue is empirical. The focus here is on the responsiveness of prices received and prices paid by farmers to an increase in the general price level.

The conceptual framework was developed in a previous study (Tweeten 1980a) relating farm prices to the general price level. My earlier empirical estimates indicating that prices received by farmers change in proportion to the general price level are supported by other studies (see Gardner). However, my earlier estimates showing that prices paid by farmers change relatively more than the general price level are disputed by other studies (see Gardner). To help resolve the issue, I here present new estimates for the impact of inflation on prices paid.

The economic model is the input supply equation specified as

$$(1) \quad P_t = f(Q_t, U_t, C_t, M_t, D_t, PG_t, PG_{t-1}, \dots)$$

where

P_t = Index of prices paid by farmers for production inputs including interest, taxes, and wage rates. The index of prices paid by farmers for items of nonfarm origin, PP_t , available only for the 1965–81 period, was alternatively used as the dependent variable.

Q_t = Index of aggregate farm production inputs.

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U_t = National unemployment rate.
 C_t = Capacity utilization rate in U.S. manufacturing.
 D_t = Dummy variable; each year with a higher inflation rate than the previous year = 1, and all other years equal zero.
 PG_t = Implicit price deflator index of the Gross National Product. The consumer price index PC_t was alternatively used as a measure of the general price level.

Each index was expressed as a percent of its 1967 value. Data were annual observations from 1948 to 1981, unless otherwise indicated, and were from the Council of Economic Advisors and the U.S. Department of Agriculture.

Inflation might impact on farm prices differently, depending on whether inflationary pressures (validated by an increase in money supply) come from demand-pull, cost-push, structural friction, or other sources. Accordingly, equation (1) includes the degree of excess manufacturing capacity in the economy as measured by C_t , wage-price inflationary pressure as measured by U_t , and demand-led inflationary pressures originating from an increase in money supply, M_t . Coefficients of these variables were statistically insignificant, either singly or interacting with the general price level, hence the variables were excluded in subsequent empirical equations. The coefficients of dummy variable D_t and of another dummy variable allowing for a change in the intercept for the last half of the 1948-81 estimation period were also insignificant, and the variables were removed from the equation.

The wage rate (along with U_t to represent labor markets) and other prices, such as for energy, could be included in equation (1) with a two-step process to estimate these input prices as a function of general prices to record the impact of inflation on P_t . This procedure was rejected in favor of the "reduced form."

A Nerlove-type adjustment model relating the general price level to prices paid by farmers produced the following ordinary least squares equations fitted to U.S. annual data for the 1948-81 period.

$$\begin{aligned}
 \text{(1a)} \quad P_t &= -144.31 + 1.18Q_t + .76PG_t + .54P_{t-1} \quad R^2 = .996 \\
 \text{(s.e.)} & \quad (46.26) \quad (.43) \quad (.19) \quad (.15) \quad \text{DW} = 4.89^{**} \\
 \text{(Pr>t)} & \quad (<.01) \quad (.01) \quad (<.01) \quad (<.01) \quad \text{Rho} = .36 \\
 \\
 \text{(1b)} \quad P_t &= -85.76 + .67Q_t + .74PC_t + .46P_{t-1} \quad R^2 = .995 \\
 \text{(s.e.)} & \quad (37.26) \quad (.36) \quad (.20) \quad (.18) \quad \text{DW} = \text{Indet.} \\
 \text{(Pr>t)} & \quad (.03) \quad (.07) \quad (<.01) \quad (.02) \quad \text{Rho} = .34
 \end{aligned}$$

Several problems are apparent in the specification. First-order autocorrelation of residuals is indicated by Rho and the highly significant Durbin-Watson h statistic in equation (1a), and determinate h in equation (1b). Both equations display expected coefficient signs, but the magnitudes are suspect. The elasticities of P with respect to PG or PC are expected to be near 1.0 in the long run, but are 1.65 for equation (1a) and 1.37 for (1b). A more flexible specification is desired, allowing for differential short-run impacts of PG and PC on P_t . Hence, the expectation of PG^*_t , is expressed as a function of the level and change in PG_t :

$$\begin{aligned}
 \text{(2)} \quad PG^*_t &= g_0 PG_t + g_1 \Delta PG_t \\
 &= (g_0 + g_1) PG_t - g_1 PG_{t-1}.
 \end{aligned}$$

After inserting this expectation model for PG_t and PC_t into equation (1), the resulting ordinary least squares estimates of input supply for the 1948-81 period are

$$\begin{aligned}
 \text{(2a)} \quad P_t &= -69.14 + .61Q_t + 2.35PG_t - 1.94G_{t-1} + .64P_{t-1} \quad R^2 = .998 \\
 \text{(s.e.)} & \quad (35.15) \quad (.32) \quad (.31) \quad (.34) \quad (.11) \quad \text{DW} = 1.14 \\
 \text{(Pr>t)} & \quad (.06) \quad (.07) \quad (<.01) \quad (<.01) \quad (<.01) \quad \text{Rho} = .15 \\
 \\
 \text{(2b)} \quad P_t &= 21.95 + .19Q_t + 1.52PC_t - 1.19PC_{t-1} + .69P_{t-1} \quad R^2 = .997 \\
 \text{(s.e.)} & \quad (35.09) \quad (.32) \quad (.26) \quad (.31) \quad (.16) \quad \text{DW} = 7.07^{**} \\
 \text{(Pr>t)} & \quad (.54) \quad (.57) \quad (<.01) \quad (<.01) \quad (<.01) \quad \text{Rho} = .35
 \end{aligned}$$

All coefficients display expected signs. Judging by the R^2 , insignificant autocorrelation coefficient in equation (2a) and the magnitudes of the coefficients on PG and PC , the specification of equation (2) is superior to that of equation (1). A 1-percent increase in the general price level is associated with a 1.5- to 2.4-percent increase in prices paid by farmers in the short run and by a 1.06- to 1.14-percent increase in the long run with elasticities computed at 1967 means. The coefficients of PG_t and PC_t are significantly greater than 1.0. The implied existence of a real farm-price impact of inflation in the short run but none in the long run is a more plausible result than that of equation (1).

Because Q_t contributes to multicollinearity and because its coefficients were not significant in equation (2) and were much less significant in equations for shorter time periods, the input supply equation omitting Q_t is shown for various time periods in Table 1 as

Table 1. Farm Input Supply Equations Estimated by Ordinary Least Squares, U.S. Annual Data for Selected Time Periods with P_t Dependent.

Independent Variables	Equation Number (and Period)					
	3a (1948-81)	3b (1948-81)	3c (1948-64)	3d (1948-64)	3e (1965-81)	3f (1965-81)
Intercept	-2.21 (3.45)	-1.82 (3.83)	7.85 (6.19)	5.32 (5.35)	-21.50 (14.87)	-1.64 (11.22)
(Pr > t)	(.53)	(.64)	(.23)	(.34)	(.17)	(.96)
PGt	2.34 (.33)		2.03 (.35)		2.31 (.55)	
(Pr > t)	(<.01)		(<.01)		(<.01)	
PGt-1	-2.15 (.34)		-1.76 (.39)		-1.67 (.67)	
(Pr > t)	(<.01)		(<.01)		(.03)	
Pct		1.52 (.26)		1.45 (.21)		1.46 (.46)
(Pr > t)		(<.01)		(<.01)		(.01)
Pct-1		-1.26 (.28)		-1.10 (.28)		-1.27 (.57)
(Pr > t)		(<.01)		(.01)		(.05)
Pt-1	.80 (.08)	.75 (.13)	.61 (.17)	.57 (.19)	.53 (.22)	.81 (.26)
(Pr > t)	(<.01)	(<.01)	(<.01)	(<.01)	(.03)	(.01)
R^2	.998	.997	.951	.956	.997	.995
DWh ^a	.39	2.74**	-.07	-.04	1.41	Indet.
Rho	.06	.32	-.09	-.06	.15	.34
Long-run Elast.	.95	1.04	.69	.81	1.36	1.00

^a Double asterisk denotes significance at .01 probability level.

equations (3a)-(3-f). Coefficient signs and significance levels are favorable; autocorrelation is not a serious problem, and R^2 's are high. Results are broadly consistent among time periods, indicating that higher inflation rates and energy-price increases in the later period did not markedly change short- and long-run elasticities of P with respect to the general price level.

An even greater short-term impact of general inflation is apparent with PP_t , prices paid by farmers for items of nonfarm origin, as the dependent variable. In equation counterparts to those in Table 1 for the 1965-81 period, with PP_t dependent, the coefficient was 3.02 for PG_t and 1.85 for PC_t .

The high correlation between current and lagged values of the general price level might cause coefficient instability and inflate standard errors.¹ Several approaches were used to ascertain the impact of multicollinearity. It is notable that coefficients from equations estimated with first differences of the general price level and hence with minimal correlations among independent variables fell between absolute values of coefficients of the lagged and current values in equations (2) and (3). (First difference equations force the long-term elasticity to zero and are not shown.) Equations in Table 1 were also estimated with real prices (P_t/PG_t and P_t/PC_t) as dependent to reduce multicollinearity.² R^2 's were lower, but interpretations were unchanged—inflation significantly raises real prices paid by farmers in the short run.

Additional equations were estimated to further explore the impact of multicollinearity and coefficient behavior under alternative lag structures (Table 2). Equations (4) and (5) were estimated by ordinary least squares, with respectively two and four general price level variables. Equations were also estimated with a third degree polynomial and general price level lag of four years and of six years. The polynomial equation results for the four-year lag were nearly identical to those from ordinary least squares equation (5), and hence are not shown. Results of the third-degree polynomial with a six-year lag are shown in equation (6).

Based on signs and significance of regression and first-order autocorrelation coefficients, results in Table 2 are inferior to those in Table 1. However, the important point is that a broad range of specifications support the conclusion that inflation increases real prices paid by farmers—all coefficients of PG_t and PC_t in Table 2 are significantly greater than 1.0.

All of the coefficients of PG_t and PC_t in equations (2), (3a)-(3e), (4), (5), and (6) significantly exceed 1.0, indicating prices paid by farmers increase more than the general price level in the short run. The "over-reaction" to inflation is mostly offset after one year, and most of the long-term elasticities, computed at the

Table 2. Prices Paid by Farmers P_t Estimated as a Function of the General Price Level by Ordinary Least Squares and Polynomial Distributed Lag, Annual U.S. Data.

Variable	Equation Number ^a (and Period)					
	4a (1948-81)	4b (1948-81)	5a (1950-81)	5b (1950-81)	6a (1950-81)	6b (1950-81)
Intercept (s.e.)	-19.89 (6.44)	-14.26 (4.69)	-5.79 (8.71)	-12.46 (8.04)	-4.36 (8.75)	-13.15 (9.00)
$PG(PC)^3t$ (s.e.)	3.77 (.64)	2.12 (.35)	3.80 (.69)	2.49 (.47)	2.82 (.40)	1.67 (.27)
$PG(PC)t-1$ (s.e.)	-2.59 (.72)	-.99 (.40)	-2.36 (1.30)	-2.09 (.88)	-.32 (.36)	-.28 (.24)
$PG(PC)t-2$ (s.e.)			1.40 (1.33)	1.49 (.97)	-.75 (.31)	-.33 (.20)
$PG(PC)t-3$ (s.e.)			-1.90 (.79)	-.79 (.58)	-.005 (.29)	.34 (.20)
$PG(PC)t-4$ (s.e.)					.35 (.36)	.55 (.24)
$PG(PC)t-5$ (s.e.)					-1.20 (.41)	-.86 (.29)
R^2	.989	.994	.992	.994	.994	.995
DWd ^b	.50	.48	.56	.66	.72	.74
Rho	.73	.73	.71	.66	--	--
Long-run Elast.	1.18	1.13	.94	1.10	.90	1.09

^a Equations numbered with a "b" have PC independent. Variables are defined in the text.

^b All Durbin-Watson d statistics are significant at the .01 level.

1967 mean and shown in the last row of Table 1, are not much different from the anticipated value of 1.0. Considering all plausible specifications and all time periods evaluated, no basis exists to reject the hypothesis that inflation has a short-run real price impact on the farming industry through prices paid by farmers.

Even if prices paid by farmers increase more than the general price level in the short run, the ratio of prices received, P' to prices paid by farmers will not decline if P' is as responsive as P to general prices. In an earlier study (Tweeten 1980a), I concluded that the elasticity of P' with respect to PG was not significantly different from 1.0. Using coefficients from equations (3a) or (3e), the implication is that each 1-percent increase in PG reduces the parity ratio by $2.3 - 1.0 = 1.3$ percent in the short run. Equations using the consumer price index to measure the general price level give lower elasticity estimates of P with respect to PC . The elasticity of prices received P' with respect to PC was not estimated in my earlier study, but would probably be lower than the elasticity of P' with respect to PG and hence less than 1.0. The ratio of the two elasticities might be similar to that between coefficients of

¹ Correlation coefficients among interdependent variables are:

	PG_{t-1}	PC_t	PC_{t-1}	P_{t-1}	Q_t
PG_t	.9976	.9976	.9976	.9912	.2668
PG_{t-1}		.9956	.9978	.9896	.2541
PC_t			.9986	.9958	.3121
PC_{t-1}				.9952	.3002
P_{t-1}					.3603

² The specification with P_t/PG_t (or P_t/PC_t) and Q_t dependent was also estimated jointly with an input demand equation by three-stage least squares. The coefficient of Q_t in the input supply equation was insignificant, indicating no need for joint estimation of input price and quantity in a simultaneous system. (It may be noted that equations with deflated values P_t dependent also included deflated lagged values of the same variable as independent to form the distributed lag model.)

PG_t and PC_t in Table 1. Thus, estimates of inflation's impact on the ratio P'/P might not be changed appreciably by using PC rather than PG as a measure of the general price level. Some of the specifications noted earlier provide even larger values for the real price effect of inflation on the farming industry.

Which estimate of the general price level, PG or PC , is preferred? The advantage of PG , the implicit deflator of GNP, is its comprehensive coverage of goods and services. The advantage of PC , the consumer price index, is that it, like P , is a modified Laspeyres index. Laspeyres indices overestimate general price changes in an inflationary economy. Biases are somewhat offsetting in estimating the impact on P of PC but not of PG . However, both PG and PC indicate that inflation generates unfavorable short-run real price impacts on the farm economy.

Other investigators found no evidence that inflation reduces real farm prices (see Gardner). While I consider my estimates convincing based on theoretical and applied grounds, I will let more unbiased observers judge which results are most plausible.

Finally, it may be noted that a dummy variable allowing different responses of farm prices to falling and rising inflation rates had an insignificant coefficient, suggesting that responses of P are symmetric for rising and falling general prices.

Cash-Flow Impacts

I have elsewhere (Tweeten 1981b) developed the theory of the impact of inflation on cash flow in farming and will only briefly review the issue here. The fundamental theorem is that over time the current rate of return on a durable resource such as farmland is invariant to inflation. Empirical evidence supports this theory; the current rate of return on farmland has tended to average approximately 4 percent, whether the inflation rate is high or low.

Because real estate accounts for 80 percent of farm assets, the implication for farmers of this fundamental theorem is profound. If land earnings keep pace with inflation, as they have historically (with some notable exceptions such as the early 1980s), and if land prices average approximately 25 times earnings as in the past, then capital gain can be expected to compensate landowners for inflation. The cash-flow problem arises because capital gain is unrealized until land is sold, while mortgage interest rates rather swiftly sum to the real rate of interest (about 3 percent) plus the premium for expected inflation. Thus, if no inflation is anticipated, the current farmland return of 4 percent and mortgage interest at a similar rate create no cash-flow problem on a perpetual mortgage. But with expected inflation of 9 percent, the current return on farmland remains at 4 percent, while mortgage interest rate rises to $3 + 9 = 12$ percent, creating a cash-flow deficit of $12 - 4 = 8$ percent of land values. A capital gain of 9 percent eventually compensates so that returns of $4 + 9 = 13$ percent cover interest costs. In theory, landowners could borrow on capital gains to cover the cash-flow deficit, but creditors are hesitant to lend on uncertain

“paper” profits difficult to confiscate in case of default. Thus, inflation raises immediate costs and defers returns.

Cash flow influences investment. High rates of inflation tilt net cash flow toward large deficits in early years and large surpluses in later years of the farm firm life cycle (Tweeten 1981b). This promotes high average rates of savings and investment because it forces high investment rates to survive in early years and encourages high savings rates out of large discretionary cash surplus in later years.

Real Wealth Impacts

In the past, farmers benefited greatly from inflation because they were net debtors who incurred long-term interest obligations at rates well below the subsequent inflation rate. The requirement for such real wealth gains is that inflation be unanticipated by lenders, that long-term mortgages be contracted at fixed interest rates, and that farmers be net debtors. Future real-wealth gains are unlikely to approach levels of the pre-1980s. Creditors “burned” badly by real-wealth losses in the past are unlikely to repeat their mistakes; they will lend either at high fixed interest rates or at flexible rates tied to inflation. There is no reason to expect debtors to be any wiser than creditors in consistently anticipating future inflation and thereby accruing real-wealth gains.

A second source of real-wealth gains prior to 1980 was land earnings increasing faster than earnings on other investments. As owners of two-thirds of farmland, farmers benefited massively not only from land earnings but also from resulting real land price appreciation. Since 1980, the situation has reversed with land earnings and prices falling and farm owners incurring real-wealth losses. Real prices for farm output are expected to increase somewhat from 1982 to 2000, raising land earnings, land prices, and real wealth gains. The source of these increases will be mainly Marshallian supply-demand factors, rather than government fiscal-monetary policy.

Instability Impacts

Flexible interest rates increasingly used to cope with the inflation cycle reduce chances for real-wealth transfers between debtor and creditor and, like flexible exchange rates, reduce the incidence of major long-term economic shocks to the farming economy. But like flexible exchange rates, flexible interest rates probably increase short-term economic instability in farming. Short-term instability of interest rates is further aggravated by the Federal Reserve Board policy, dating from October 1979, of attempting to stabilize money supply rather than interest rates in the face of fluctuating demand for money. Uncertainty about future inflation rates raises long-term relative to short-term interest rates, encouraging use of short-term financial capital and discouraging long-term capital investments.

Other costs of inflation and instability arising from

the inflation cycle can be listed (Tweeten and Griffin). The inflation cycle arbitrarily redistributes income and wealth, creating social friction. Real capital investments tend to be attractive in the expansion phase and financial capital in the stabilization phase of the inflation cycle. Costs are incurred in shifting funds among financial investments, real capital investments, and cash balances. Taxes on nominal interest and capital gains distort incentives. The optimal resource level and mix for given inflation expectations become suboptimal when actual inflation rates turn out to be different than anticipated.

Whatever its intentions, the Federal Reserve has in fact pursued an erratic policy, contributing to the inflation cycle by increasing money supply at a pace that generates unacceptable inflation, then reducing money supply to generate unacceptable recession. The domestic income effect of this inflation cycle on the farm economy is less than in the past because of the low income elasticity of demand for food, but is severe for the beef sector, which supplies a product with a relatively high income elasticity of demand. Income of farmers is also affected by the inflation cycle because they depend increasingly on off-farm job earnings, which are buffeted by fluctuating employment opportunities through the inflation cycle.

Impacts of the inflation cycle are also influenced by growing international linkages. The expansion phase of the cycle is characterized by increasing imports and decreasing exports induced by rising domestic income and prices relative to other countries. In time this trade imbalance may be redressed by a declining value of the dollar in foreign exchange and by foreign economic growth induced by economic growth in the U.S. Both of the latter force increases in U.S. exports.

Unfavorable fiscal-monetary policy may weaken the economic performance of nonfarm industries more than of the farming industry. The result may be a declining value of the dollar in world markets, but a relative advantage for U.S. agriculture, apparent in rising real farm prices and exports. Again the inflation cycle creates instability through this linkage.

If fiscal policy and monetary policy work at cross-purposes, as in the 1980s, other consequences of the inflation cycle follow. A contractionary monetary policy coupled with an expansionary fiscal policy makes federal government deficit financing a strong competitor for financial capital, driving up real estate interest rates. Interest rates are also raised in an uncertain and unstable economic environment because financial capital suppliers demand a risk premium. Fear that the Federal Reserve will not hold to tight-money policy in the face of unemployment and large federal deficits creates expectations of future inflation that add to the interest charge. High real interest rates retard investment, employment, and economic growth in the domestic economy, while attracting financial capital from abroad. The reduced supply of dollars abroad raises the value of the dollar in foreign exchange, depressing farm and nonfarm U.S. exports. The weak U.S. economy imports less and depresses foreign economies, which in turn import less from the U.S. High interest rates in

the U.S. create high interest rates elsewhere, contributing to a foreign financial crisis. Trade wars and protectionist policies also attend the poorly performing U.S. and world economies.

Empirical analysis indicates that farmers have a high propensity to invest out of transitory income, which is large in an unstable economic environment. Empirical models of the permanent income hypothesis applied to farming reveal that investment is greater with an unstable than with a stable income, other things being equal. An unstable economic environment generates excess capacity in peak income and production periods, which remains underutilized in slack periods because it is specialized to agriculture. An unstable economic environment requires resources for risk avoidance strategies, such as hedging, forecasting, diversifying, storing, renegotiating contracts, revising prices, and managing liquidity, that would not be needed in a stable environment.

The net effect on resource use and efficiency of inappropriate and unstable fiscal-monetary policy averaged over inflation cycles can be judged only imperfectly. My conclusion is that instability reduces economic efficiency (Tweeten 1979, Chapter 7). Instability may increase investment and aggregate input volume, but may reduce output.

IMPLICATIONS FOR FARM SIZE AND TYPE

The analysis now turns to implications of fiscal-monetary policy for farm size and type through the cost-price, cash flow, real wealth, instability, and other intermediaries discussed above. Future real-wealth transfers may be small, hence they are omitted. The cost-price phenomenon primarily impacts on structure through instability, interacting with the inflation cycle to accentuate farm price instability. The following discussion focuses primarily on the impact of instability and cash flow on farm structure with particular attention to competitive advantage of (1) entry-level versus established farmers, (2) renters versus owner-operators, (3) industrial-conglomerate corporate farms versus family farms, and (4) part-time versus full-time operators. Each situation will be evaluated under favorable versus unfavorable fiscal-monetary policies with the former defined as one providing high employment and consistent economic growth under a stable general price level.

Entry Versus Established Family Farmers

In the past, a major advantage of the family farm has been its capacity to withstand economic instability. The farm family did so by supplying a considerable portion of farm equity, labor, and management resources. The family would survive economic adversity by "tightening its belt," accepting low returns to owned resources, and foregoing expenditures while awaiting better times. With rising asset requirements and cash costs for an economic size unit, the full-time family

farm is less able to do so. Established farmers who have accumulated considerable equity and a favorable debt-asset ratio can still do so, but not the highly leveraged beginning farmer faced with the cash-flow squeeze engendered by inflationary fiscal-monetary policy. High inflation does not affect farm firm growth substantially, but severely impairs entry of prospective full-time family farmers (Eginton and Tweeten). As established family farmers compete effectively against prospective family farmers for opportunities, farm structure is tilted to larger, fewer units in an unfavorable macroeconomic policy environment.

Renters Versus Owner-Operators

Cash-flow problems in agriculture arise primarily from buying land. With a given equity, an operator can withstand cash-flow and instability problems arising from unfavorable fiscal-monetary policies or other sources better as a renter rather than an owner. An absentee landlord servicing a mortgage out of a medical practice or other nonfarm income can deal with cash flow and instability problems more readily than can a full-time farm owner-operator depending on the farm for income. It follows that unfavorable fiscal-monetary policy tilts land ownership to absentee landlords and to farm operator tenancy and part-ownership. A decrease in the proportion of farmland owned by farm operators is expected.

Corporate Industrial-Conglomerate Versus Family Farms

Farms with diversified sources of farm and nonfarm income and debt and equity capital can withstand cash-flow and instability problems better than can full-time family farmers who depend on farm income. The corporate conglomerate avoids the life cycle financial problems of the family farm. Ever larger asset and cash cost requirements per dollar of farm output coupled with marketing economies on larger operations and advantages of highly sophisticated technology (e.g. computers) and risk management strategies also make conglomerate farms effective competitors with family farms. A chief advantage of family farmers—devoted, high-quality operational management and husbandry coupled with willingness to temporarily postpone consumption or accept lower average real return on owned resources over time—is probably relatively less important now than in the past for survival. Coping with the inflation cycle has hastened the development of sophisticated risk management strategies and negotiated or administered pricing in agriculture characterized by economies for large farm firms. Thus unfavorable fiscal-monetary policy abets the trend to market concentration and away from atomistic competition. Although the pace of conglomerate encroachment into farming will probably be slow at any rate, unfavorable fiscal-monetary policy quickens the pace.

Part-time Versus Full-time Operators

Small farming operations produce less efficiently on the average than larger farms, when all resources are

valued at opportunity costs. The number of small units operated by able-bodied, full-time farmers has diminished sharply. Part-time small farms are economically viable and growing in numbers. Many families value highly the farm way of life and are willing to pay for this consumption preference by subsidizing small farm residency out of nonfarm income. These consumptive part-time small farmers can cope with cash-flow and instability problems by using nonfarm income to supplement farm income. They are further encouraged by taxation policies and subsidized rural community services to be farm residents. Surveys indicate that part-time farming is a widely preferred "permanent" activity; such farmers for the most part are positioning themselves neither to become full-time farmers nor to become nonfarm residents. Life-cycle historic data from a survey in Oklahoma suggest that small farm operators started small, and full-time commercial farm operators started somewhat large. Thus, part-time small farms and full-time large family farms seem to be somewhat distinct entities with relatively few cross-overs between the two. Given the barriers to new full-time operations, the desire for farm residence, and the success of part-time small farmers in coping with cash-flow and instability problems associated with unfavorable fiscal-monetary policy, the number of part-time small farms is expected to increase relative to full-time family farm operations.

TAX POLICY

This paper has emphasized federal fiscal-monetary policy as it affects aggregate demand and general price level. The specific form of federal spending and taxing policies also affects structure. Federal income and estate taxes appear to influence farm structure much more than other major programs, such as federal credit and commodity programs.

Other things equal, progressive income and estate taxes would discourage growth of large farms. Other things are not equal, however. Progressivity of federal taxes has been offset by tax credits and deductions over considerable income ranges (Sisson). A central feature of income tax credits and deductions is that they subsidize capital, while payroll taxes increase costs of labor—thus the tax system encourages substitution of capital for labor (Boehlje; Davenport, et al.; Eginton). Tax deductions interact with inflation and income, giving a comparative advantage in bidding for farm resources to investors with high incomes. With land the major capital input in farming, the implication is that federal income taxes bring about larger, fewer farms. Tax laws encourage expansion of individual farm firms and exert upward pressure on land prices, creating barriers to farm entry.

Recent federal tax law has essentially removed estate taxes on transfer of an economic size farming unit among generations. Based on simulations of a typical commercial Oklahoma farm, if an owner-operator with minimum initial equity died after 30 years of farming, he could leave double his initial real equity to each of

two heirs, along with a lifetime annuity to his spouse (Eginton). If each of the two heirs had spouses who received similar inheritance, the implications for accumulation of farm assets among generations and eventual growth into larger-than-family-size farms is apparent. Many federal tax provisions are available only in farming and have the greatest value for persons with high wealth and income, thus tilting farm structure in the same direction as the unfavorable fiscal-monetary policy discussed above. Tax laws especially disadvantage potential young operators who are not sons or sons-in-law of established operators.

CONCLUSIONS

Unfavorable fiscal-monetary policy tilts comparative advantage to (1) established family farms, (2) renters, including part owners, (3) corporate industrial-conglomerate farms, and (4) part-time small farms. The gains in these categories are associated with a decline in entry-level full-time family farms—which eventually means fewer full-time family size farms. Land ownership and operation will be increasingly separated, with ownership tilting toward nonfarm absentee landlords and corporate stockholders. Unfavorable fiscal-monetary policy also appears to increase capital-labor ratios and possibly investment, while reducing overall economic efficiency.

High real interest rates and a depressed economy promoted by expansionary fiscal policy and tight money policy in the early 1980s may have been the worst of all environments for the mid-size family farm, but favorable fiscal-monetary policy is also no unmitigated boon to farm structure. The two major factors determining farm size are personal income and tech-

nology (Tweeten 1980b, p. 117). Farms must grow in scale for farm income to keep pace with rising income of nonfarmers. Favorable fiscal-monetary policy causes income and technology growth, resulting in fewer, larger farms. Thus there may be fewer farms on the average with favorable fiscal-monetary policy, but the impact of unfavorable policy is to push the composition of those farms away from the family ideal of full-time owner-operator units that allow the family to make most of the decisions and supply most of the labor and equity capital.

The behavioral responses of aggregate farm structure to federal fiscal-monetary policy have not been quantified, necessitating a treatment herein largely based on deductive logic. The logic receives support from several sources. One is quantification in studies using deterministic rather than behavioral models of typical farm firms under various tax policy and inflation scenarios (Boehlje; Davenport, et al.; Eginton). If individuals act rationally to increase after-tax income, these models help to predict actual outcomes. Also, actual observed movement of the farming economy in the direction predicted herein provides at least circumstantial evidence in support for the conclusions of this analysis.

I have elsewhere (Tweeten 1981a) detailed needed changes in federal policy to restore economic vigor with price stability. Space limitations here preclude spelling out such a policy, but important elements include (1) internationally coordinated fiscal-monetary policy, (2) decisive action to ensure a more nearly balanced post-recession federal budget, and (3) restructuring the economy to create resiliency and reduce the natural rate of unemployment through a wage supplement and antitrust legislation applied to organized labor.

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