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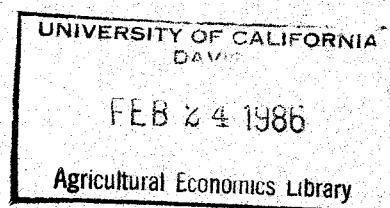
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The Demand for Federal Farm Credit Legislation: 1948-79

by

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Abstract

The federal government has often taken an active role in providing credit to the agricultural sector. This paper identifies the federal credit legislation enacted during the 1948-79 time period and develops a model to establish an association between credit legislation and underlying economic forces. This model showed the debt-equity ratio and bankruptcy rate as being positively related to the demand for legislation.

The Demand for Federal Farm Credit Legislation: 1948-79

This paper is concerned with explaining the demand for federal farm credit legislation over the time period 1948-79. Such an effort is meaningful in the context of the economic plight of farmers and the recent administrative (Federal Register) and legislative attempts to extend additional credit assistance to the agricultural sector. The analysis is based upon a plausible assumption that the demand for credit legislation should depend on the financial performance of the farm sector, a premise which was intimated by Alston in his examination of the relationship between moratorium legislation and economic forces that precipitated the need for such legislation. A renewed interest in factors explaining farm failures is evident (Shepard and Collins), particularly since the agricultural sector is responsive to macroeconomic shocks that impact on its financial performance (Chambers and Just; Gardner). In a more general context, Gardner (1979) analyzes the socially optimal quantity of regulation in a demand-supply framework. No study to date has attempted to associate the demand for federal farm credit legislation to the financial performance of the agricultural sector.

Section I reviews Agricultural Credit Legislation over the period 1948-79. Only legislation that had a significant bearing on the performance of the U.S. agricultural sector was identified and highlighted. Following this, an effort is made to forge a link between the risk of bankruptcy and the demand for legislation. A discrete choice model that relates observed credit legislation to underlying economic variables is then estimated in Section III. Empirical results thus obtained serve as a basis for drawing conclusions in the final section.

The conceptual analysis of the need for federal legislation concerning the extension of credit to the agricultural sector proceeds in two steps. Legislation was deemed to be significant if it contained a major recodification of provisions or provisions which could be expected to markedly increase the classes of persons who qualified for governmental credit assistance. The extension of governmental assistance to various commodity groups, such as set-aside programs, price supports, the payment-in-kind program, and emergency livestock loan assistance, were excluded from the conceptual analysis. The basis for this exculsion was that the primary intent of commodity programs is the provision of an adequate income. The second step is a model which adapts from Alston the assumption that Congressmen enact remedial legislation in order to be reelected, and that the demands of the borrowers have overshadowed resistance by opposing groups.

I. Federal Farm Credit Legislation

The United States government has a long and distinguished history of encouraging agriculture through legislation beneficial to farmers. The Federal Farm Loan Act (39 Stat. 360-384), the Farm Credit Act of 1933 (48 Stat. 257-273), and The Bankhead-Jones Farm Tenant Act (50 Stat. 522-533) were significant in providing farmers with credit prior to World War II. The Farmers Home Administration Act of 1946 (60 Stat. 1062-1080) markedly amended federal credit provisions and subsequent amendments have expanded and refined this legislation.

The first post-World War II federal public law containing significant provisions regarding agricultural credit was Title V of the Housing Act

of 1949 (63 Stat. 413-439). This Act authorized the Secretary of Agriculture to extend financial assistance to owners of farms to construct, improve or repair dwellings and other farm buildings. Housing loans were made available to farm owners and qualifying tenants who lacked a decent, safe and sanitary dwelling, were without sufficient resources to provide the necessary housing and buildings, could not reasonably secure credit for such housing from other sources, and could be expected to have the resources to repay the loan.

The next major Act concerning farm credit legislation was the Farm Credit Act of 1953 (67 Stat. 390-400). This Act established a new farm credit system with greater farmer ownership and less dependence upon the Secretary of Agriculture or other Washington officials. Congress also enacted Public Law 115 in 1953 which included special provisions for livestock loans and emergency assistance in furnishing feed and seed.

In 1954 Congress enacted Public Law 727 (68 Stat. 999-1000) which authorized the Secretary of Agriculture to make emergency loans for agricultural purposes except for refinancing existing indebtedness in areas where a need for such credit existed. The amount of loans was limited to \$15 million with no single loan exceeding \$15,000 and no indebtedness of a borrower to exceed \$20,000. These emergency loan provisions were to expire after one year, but were subsequently extended through 1959.

The Farm Credit Act of 1955 continued the efforts to reduce governmental control in the federal farm credit system (69 Stat. 655-666). The Act established a new method for the distribution of net savings. A number of modifications concerning the production credit system and the federal land bank system were included.

In 1956 Congress merged the production credit corporation in each farm credit district with the federal intermediate credit bank of the district in the Farm Credit Act of 1956 (70 Stat. 659-668). Congress also enacted Public Law 878 (70 Stat. 801-804) which contained several noteworthy amendments to the Bankhead-Jones Farm Tenant Act. The law authorized FmHA to accept second mortgages, extended the authority to make economic-emergency loans through 1959, and permitted FmHA to make non-real estate loans to qualified part-time farmers.

The Agricultural Act of 1961 included Title III which is cited as the Consolidated Farmers Home Administration Act of 1961 (75 Stat. 307-318). This Act constituted a major recodification and consolidation of the provisions governing the extension of credit by FmHA in Title 7, U.S. Code, that has survived through the present (7 U.S.C. §§ 1921-1996). The Act included the provision that FmHA real estate farm loans could only be made to persons unable to obtain sufficient credit from other sources at reasonable rates and terms.

Two public laws were enacted in 1968 which impacted farm credit. Public Law 90-488 expanded the uses qualifying for credit to include financing of farmers or ranchers engaged in the development of outdoor recreation enterprises or other enterprises to supplement their farm income (82 Stat. 770-771). Public Law 90-582 concerned the Federal Farm Loan Act and added provisions concerning the retirement of stock held by the federal government (82 Stat. 1145-1146).

The Farm Credit Act of 1971 incorporated important changes concerning the authority for federal intermediate credit banks and production credit associations to extend credit to nonfarmers in rural areas (85 Stat. 583-625). This included not only loans for nonfarm housing but also

financially related services to "persons furnishing to farmers and ranchers farm-related services directly related to their on-farm operating needs" (85 Stat. 601). The Act also reduced the amount of funding required as security by borrowers before they could qualify for a loan.

The Rural Development Act of 1972 (86 Stat. 657-667) contained several significant amendments to the Consolidated Farmers Home Administration Act. The FmHA was authorized to issue loans and grants for rural development generally to public bodies to prepare comprehensive plans for rural development. Loans and loan insurance were made available for qualifying persons for rural industrialization assistance. The Act enabled FmHA to insure watershed production and flood prevention loans and resource conservation and development loans.

Public Law 94-68, enacted in 1975, amended the Consolidated Farm and Rural Development Act (89 Stat. 381-382). The eligibility requirements for emergency loans were expanded to include aquaculture and loans were to be made to applicants that were unable to obtain credit elsewhere to finance their actual needs at reasonable rates and terms. This Public Law also extended FmHA's authority to make loans to finance crop or livestock changes deemed desirable by the applicant and extended the permissible time period which and Secretary could establish for the repayment of emergency loans.

Congress again amended the Consolidated Farm and Rural Development Act in 1978 (92 Stat. 420-434). Public Law 95-334 expanded the purposes of real estate loans to include waste pollution abatement facilities, increased the percentage of development costs for certain projects which

qualified for governmental grants, and enabled the Secretary to make or insure loans for financing rural electric systems. A new provision was added authorizing a low-income farm ownership loan program. Public Law 95-334 also introduced loan moratorium provisions, which enable FmHA borrowers to request the deferral of principal and interest payments when default arises from circumstances beyond the borrower's control.

II. Farm Bankruptcy and the Demand for Legislation

The agricultural firm is assumed to maximize the expected present value of future cash flows over an infinite horizon. Represent cash flow at time t by $C(t)$ and let α be the constant discount rate. The risk-neutral firm solves the following problem by choosing appropriate optimal controls.

$$\text{maximize } V(t) = E_t \sum_{t=t_0}^{\infty} \{\alpha^{(t-t_0)} C(t)\} \quad (1)$$

E_t denotes the mathematical expectation formed at $t=t_0$ of random cash flows accruing to the firm at each future point in time. When markets function efficiently, the market value of the agricultural firm's equity must equal the present value of future cash flows defined by equation (1). Denote operating income by $X(t)$, interest payments by $I(t)$, and the effective agricultural income tax rate by θ . Then it must be true that

$$V(t) = V_E(t) + [1-\theta] [X(t) - I(t)] \quad (2)$$

where $V_E(t)$ is the ex-dividend value of the firm's equity (Chen).

Equation (2) states that the market value of a firm's equity must equal the sum of ex-dividend value and net cash flow after taxes and interest payments. A firm is declared bankrupt when the value of its equity is zero (Stiglitz). Adopting this criterion, a firm is bankrupt at time t when

$$X(t) \leq [I(t) - V_E(t) (1-\theta)^{-1}] \quad (3)$$

It is reasonable to assume that the agricultural firm will attempt to avoid the prospect of bankruptcy at all costs. That is, the optimal plan of the firm would ensure its solvency at all points in time. However, due to unanticipated changes in the relative price structure or other economic forces, the firm may approach bankruptcy. As $[I(t) - V_E(t) (1-\theta)^{-1}]$ approaches $X(t)$, the risk of bankruptcy rises accompanied by a concomitant demand for farm legislation. The present analysis assumes that the demand for legislation for the i th farm (y_{it}^*) is related to the risk of bankruptcy (R_i); hence $y_{it}^* = f(R_{it})$ and $\frac{\partial y_i^*}{\partial R_i} > 0$. The risk of bankruptcy in turn depends on a vector of variables measuring current financial performance, say Z_i , so that $R_i = h(Z_i)$. Together these relationships suggest that the demand for federal farm legislation depends on Z_i . This relationship is assumed to take the specific form:

$$y_{it}^* = B_{it}^{\tau} \ln Z_{it} + \mu_{it} \quad (4)$$

where B_{it} is the vector of parameters and μ_{it} is a disturbance term with $E(\mu_{it}) = 0$ and $E(\mu_{it}^2) = \sigma^2$, and τ denotes transposition.

Optimal legislation demand, y_{it}^* is unobservable in practice. Besides, the demand for farm legislation is likely to vary across individuals according to financial performance. Aggregate demand for legislation is the sum of demands across individuals. In practice, a dummy index that takes a value of one when farm legislation is passed and a value of zero when no legislation is passed is observed. Specifically,

$$\begin{aligned}
 Y &= 1 && \text{when } Y^* > \tilde{Y}; \\
 &= 0 && \text{otherwise.}
 \end{aligned}
 \tag{5}$$

where Y^* is the aggregate demand for farm legislation and \tilde{Y} is a threshold level. Federal farm credit legislation is enacted when aggregate demand exceeds a threshold level. The aggregate sector level relationship is assumed to resemble the micro-level demand function and is modified to

$$Y_t = \beta \ln Z_t + \mu_t.$$

For the functional form considered here, conditions necessary to insure exact linear aggregation do not hold (Gorman).

III. An Empirical Model for Aggregate U.S. Agriculture

Before proceeding to estimate equation (5), suitable assumptions about the probability distribution of the error term are necessary. The cumulative distribution function of the error term $F(\cdot)$ was assumed to be of the logistic type. The logistic distribution is defined by:

$$F\left(-\sum_j \beta_j \ln Z_j\right) = \frac{\exp\left(-\sum_j \beta_j \ln Z_j\right)}{1 + \exp\left(-\sum_j \beta_j \ln Z_j\right)} \tag{6}$$

The method of maximum likelihood provides consistent estimates of parameters in equation (5) (Maddala). This method involved maximizing the likelihood function defined by

$$L = \prod_{y_i=0} F\left(-\sum_j \beta_j \ln Z_j\right) \prod_{y_i=1} (1 - F\left(-\sum_j \beta_j \ln Z_j\right)). \tag{7}$$

The vector of explanatory variables consisted of a constant term, bankruptcy ratio, debt-equity ratio, government payments to the farm

sector, value of real estate, aggregate farm income, and farm size. These variables were assumed to be indicators of financial performance in the U.S. agricultural sector. The bankruptcy rate was defined as the ratio of bankruptcies to the number of farms. Data on these variables were available in the Statistical Abstract of the United States. A time series for farm size was available in Agricultural Statistics published by the USDA. Data for all other variables were obtained from Melichar.

Initial estimates for the parameters in equation (5) were obtained by OLS. All estimation was performed with the Regression Analysis of Time Series package on an IBM PC-XT computer. Estimated parameters for this model (OLS I) are in Table 1. Four out of seven explanatory variables were statistically significant at reasonable confidence levels, although the overall fit of the model was poor.

These initial estimates were then used as starting values in maximum likelihood estimation of the logit model (Logit I). All explanatory variables had the expected signs. A high bankruptcy rate was associated with a higher probability of agricultural legislation. Both farm income and value of real estate had negative signs. When the value of real estate declined, the probability of legislation increased. Similarly, a lower value for aggregate farm income was accompanied by a higher probability of legislation. When the debt-equity ratio increased, so did the probability of federal farm credit legislation. Finally, higher the average farm size, lower was the probability that legislation would be enacted.

While the estimated logit model performed well in terms of consistency with expected signs, the explanatory variables individually appeared to be statistically insignificant. To test for the overall validity of this

model, the statistic $P^2 = 1 - \frac{L_n}{L}$ was computed; L_n is the value of the likelihood function for the model with only the constant term while L is the corresponding value of the unrestricted model. The statistic P^2 (Pseudo- R^2) is a measure of goodness of fit and a value of 0.73 indicated a satisfactory fit. A second test involved computing the statistic $\frac{K P^2}{(1-P^2)}$. This statistic is asymptotically distributed as $F(1, K)$, where K is the number of explanatory variables in the unrestricted model (Domencich and McFadden). The null hypothesis that the explanatory variables belonged to the model could not be rejected as the computed value of this statistic exceeded its table value at the 5% significance level.

An attempt was made to experiment with the possibility of introducing lags into the model. Presumably, there is an administrative lag between the time that the indicators of financial stress reflect a positive demand and the actual enactment of legislation. To explore this possibility, all explanatory variables were lagged once. Model (4) was then estimated by OLS again (OLS II). These estimates were used as initial estimates in the new logit model (Logit II). Although the level of significance improved markedly for all variables in this version of the model, several variables had implausible signs. The value of P^2 was 0.99. The test statistic $\frac{K P^2}{(1-P^2)}$ was computed again. The computed value indicated that the explanatory variables did contribute to explaining the variation in the demand for farm credit legislation at reasonable significance levels.

IV. Conclusions

An effort was made in this paper to isolate factors influencing the enactment of federal farm credit legislation. The model presented here is a first step in the direction of satisfactorily establishing an association between credit legislation and the underlying economic forces that affect it. The main conclusion was that debt-equity ratio and bankruptcy rate were positively related to the demand for legislation. In contrast, government payments to the farm sector, value of real estate, aggregate farm income, and average farm size were negatively associated with the demand for legislation. Indicators of financial stress, such as those considered in the estimated model, tend to move together. For this reason, there was some difficulty in identifying the effects of individual variables. Future research must focus on resolving this problem. If the results of the present analysis are any indicator, such an exercise would be well worth the effort.

Table 1: Estimated Parameters for Alternative Models

<u>VARIABLE</u>	<u>OLS I</u>	<u>OLS II</u>	<u>LOGIT I</u>	<u>LOGIT II</u>
Constant	14.03 (4.86)	2.97 (5.29)	15.27 (26.17)	9.14 (28.08)
Debt-Equity Ratio	3.83 (1.59)	3.13 (1.63)	4.30 (8.62)	13.18 (8.76)
Bankruptcy Rate	0.61 (0.47)	-0.20 (0.17)	0.78 (2.51)	-0.99 (0.92)
Government Payments	-0.36 (0.17)	0.84 (0.17)	-0.34 (0.91)	3.50 (5.47)
Value of Real Estate	-0.02 (0.97)	-1.68 (2.46)	-0.22 (5.15)	-6.30 (13.55)
Farm Size	-5.15 (2.44)	-0.96 (0.48)	-5.71 (13.16)	-4.31 (2.80)
Farm Income	-0.01 (0.23)	-0.34 (0.24)	-0.09 (1.30)	-1.64 (1.38)
R^2/P^2	0.308	0.318	0.738	0.994

NOTE: Numbers in parentheses are standard errors.

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