Toward an Analysis of Farmers Home Administration's Guaranteed Farm Loan Programs

William McD. Herr

Proceedings of
Regional Research Committee NC-161

FINANCING AGRICULTURE IN A CHANGING ENVIRONMENT: MACRO, MARKET, POLICY AND MANAGEMENT ISSUES

Kansas City, Missouri
September 24-25
1990

Department of Agricultural Economics and Rural Sociology
The Pennsylvania State University
University Park, Pennsylvania 16802
May 1991

Toward An Analysis of Farmers Home Administration's Guaranteed Farm Loan Programs

William McD. Herr*

The Food Security Act of 1985 directed the Farmers Home Administration (FmHA) to make guaranteed farm loans. Following this mandate farm guarantees grew rapidly and in 1987 they exceeded the new volume of direct farm lending. However, in the late 1980's symptoms emerged indicating that all was not well with the guarantee program. These included:

1. Growth of guaranteed farm lending as a proportion of total FmHA farm loans stalled.

2. In some years guarantee authorizations were not fully used while the budget authority for direct loans was exhausted.

3. Most guarantees represented the conversion of existing loans in lenders' portfolios rather than a shift of FmHA's direct farm loans to guarantees.

Some attributed underperformance of the guarantee loan program to such things as: large amount of paperwork, cumbersome procedures, FmHA and lender personnel who could not work together and the lack of a formal secondary market in which to sell the guarantee. Given the nearly 15 years of prior experience with guarantees and changes in loan procedures during that period, it was hypothesized that other factors probably contributed to the smaller than expected role played by the farm loan guarantee program. To help understand whether other factors might be responsible for the less than satisfactory performance of the guaranteed farm loan program, an attempt was made to model the two alternative loan delivery systems. The purpose of this paper is to present these models and to discuss their implications.

The first section of the paper presents a model of a loan transaction which incorporates lender and borrower behavior when loans are guaranteed. A second section models the credit market and shows how program objectives and the nature of credit demand and supply schedules impact the choice of credit delivery mode.

A Model of a Farm Guarantee Loan Transaction

Borrowing firms are perceived as having different amounts of risk which originate in the financial, production and marketing environment. The combined effect of these represent lenders' risk associated with any loan. Normally as credit risks increase, lenders charge a higher interest rate. This compensates the lender for the expected higher rate of loss on more risky loans. While lenders modify risks by adjusting loan terms such as downpayment, maturity, collateral and loan size, this model assumes that interest rate captures their response to risk. It is

---

*Professor, Department of Agribusiness Economics, Southern Illinois University, Carbondale. This study was made possible by a Cooperative Agreement between the Economic Research Service, Finance and Tax Branch, USDA and Southern Illinois University (58-AEN-8-0040).

surmised that if interest rates and loan risks are appropriately matched, lenders would receive the same net income from loans regardless of risk. A loan-offer curve (LO) shows how interest rates increase with risk in order for a lender to receive a return equivalent to that earned on a risk-free asset (Aaron, pp. 81-84; Barth et al.). An LO curve originates at an interest rate representing the "risk-free" return (i) such as obtained from a government security, figure 1.

perspective indicates that lenders offer an array of "credit packages" from which borrowers select the one which is most appealing to them.

Thus, along LO a lender is indifferent whether the loan represents a high or low risk contract but any loan to the left or above LO would be rejected. A change in the risk free interest rate shifts the position of LO. The slope of LO may differ among lenders because perceptions of appropriate risk-rewards vary. This

Borrowers also have credit preferences. These are shown by indifference curves relating the trade-off between interest rate and the risk borrowers are able to pass on to the lender. As more risks can be passed on to the lender, the borrower is willing to pay a higher rate. Among risks which can be shifted between the borrower and the lender are those involving the amount of collateral and specifications concerning the amount and timing of repayment. Borrowers prefer indifference curves to the left to those to the right, figure 1. Tangency of LO and an indifference curve, e.g., IA, represents an acceptable credit contract to a lender and a borrower.

The effective indifference map for some borrowers, such as B, begins to the left or above any LO curve (indicated by the solid portion of the indifference map). A constrained map of this nature occurs because the firm's high risk and/or low earnings prohibits it from reaching a point on LO. Conceptually, there are many borrowers who can't get credit elsewhere whose effective indifference maps originate as points to the left of LO.

Among borrowers who can't get credit elsewhere, it is postulated that those whose effective indifference map begins just to the left or slightly above LO have a greater chance of being successful than those having characteristics placing them further from LO. Those closest to LO have a return which almost enables them to pay an interest rate commensurate with their risk as judged by commercial lenders. Or looked at the other way, their risks are viewed as being marginally greater than the interest rate which the firm's return enables it to pay. Selecting borrowers further to the left or above LO means making loans to those with lower returns and/or greater risks which in turn increases the probability of delinquency and losses.

The task is to determine how a loan guarantee program effects lender and borrower behavior. Initially assume a 100 percent guarantee. In this unlikely case, LO_{100} becomes a vertical line indicating lenders receive a sure return regardless of the lender's risk, figure 2. However, LO_{100} originates at a higher rate than i reflecting the cost of obtaining the guarantee, differences in the liquidity of the loan instrument and the risk-free security and the cost associated with obtaining reimbursement should there be a loss. For borrowing firms with risks below the point where LO and LO_{100} intersect, lenders and borrowers find it is not worth the cost to write the guarantee. Thus, the effective LO curve with a

100 percent guarantee becomes iLO_{100} (the bold line). The loan offer curve for any guarantee program of less than 100 percent will occur in the space between LO and LO_{100}. LOg is a loan guarantee program of this type.

A guarantee program such as LOg (figure 3) enables some who previously could not get credit to receive a loan (IA), enables some who previously were financed to reach a more satisfactory financing arrangement by using public credit (IB), and has no affect on others who continue to be commercially financed (IC). The situation portrayed by borrower IB indicates the difficulty faced by FmHA in applying the criteria of not being able to obtain credit on reasonable terms and rates. This borrower is able to obtain credit at a commercial source but reasonable terms and rates to this borrower are those portrayed by the tangency of IB' and LOg which permit more liberal terms and a lower rate. When borrowers like IB receive loan guarantees, there is a shift of credit from commercial lenders to FmHA. This shift is referred to as "crowding-out".

The Changed Role Of FmHA

The model shows that the shift from a direct to a guarantee program constrains FmHA's potential role in financing the farm sector in two ways. One group of borrowers excluded by a complete change to guaranteed loans would be those to the left of LO and below the intersection of LO and LOg. These are low risk farmers who are unable to pay an interest rate indicated by this portion of the LO curve. Some may be characterized as having a high equity in their businesses and from the standpoint of providing an adequately collateralized loan represent a low risk to the lender. Under a direct program many of these farmers qualified for limited resource loans. Data concerning the financial characteristics of farms (Morehart et al.) indicate that a portion of FmHA's direct borrowers have these characteristics. About one-fourth of FmHA's outstanding credit was owed by borrowers having debt-asset ratios of less than 40 percent (some had ratios of less than 10 percent).

In addition the guarantee program excludes the weakest borrowers. This occurs because of an important difference between the two credit delivery modes. There is no limit, conceptually at least, as to how far into the group of submarginal farmers (to the left and above LO) a direct program can penetrate. However, with a loan guarantee program lenders will only finance those lying between LO and LOg. Should the guarantee program accommodate all borrowers lying between LO and LOg, lenders will cease making guaranteed loans and allocate funds to alternative uses. No comparable limit exists on the credit assistance provided by a direct loan program. When a direct program is employed, penetration to the left of LO is to a large extent determined by the size of the program.

There are two pieces of evidence indicating that a change to the guarantee program would constrain FmHA's farm lending activity as inferred by the model. First, delinquency rates were more than seven times higher among FmHA's direct loan borrowers than for its guaranteed loan borrowers, table 1. This is evidence that the direct program has penetrated much farther to the left of LO than has the guarantee program. Support for the view that the guarantee program selects borrowers just to the left of LO (those who almost meet commercial credit standards) is that the delinquency rates for FmHA's operating loan guarantees based on dollar amounts was 5.1 percent, whereas for bank nonreal estate farm

loans the rate was 3.8 percent in late 1989. This supports GAO's conclusion that direct borrowers do not obtain guarantees primarily because they cannot qualify for private lender credit even with the loan guarantee (1989, p. 26).[1] The other piece of evidence in support of the model's inference that the guarantee loan program constrains FmHA assistance is underutilization of the annual guarantee loan authorization (GAO 1989). Only about 60 percent of the guarantee loan authorization was used during 1986-88.

The conclusion from the model and available evidence indicate that should FmHA lending activity shift entirely to guaranteed lending, some low risk borrowers would be excluded and FmHA's role in financing farmers unable to obtain credit from commercial sources would likely be substantially reduced.

Implications from the Micro Model about Structural Features of the Guarantee Loan Program.

The model also indicates some conditions which would help convert direct borrowers to the guarantee program something that the GAO and FmHA would like to accomplish. These conditions include: 1) a lower risk-free rate of return so that LOg shifts to the left, 2) program operating efficiencies which move i_g to the left regardless of the change in interest rates, and 3) technical assistance and loan aid (e.g., interest rate buy-downs) which improves the borrower's cash flow and thereby reduces risk. While a lower risk-free rate of return is impacted by monetary policy, the other factors can be addressed by FmHA. A secondary market for guarantees may help increase conversion of direct loans to guarantees. By further improving liquidity, loan costs are reduced and this moves i_g toward i. Finally, it is noted that when an interest rate buy-down is coupled with a loan guarantee, the probability of loan repayment is increased which reduces risk but the return earned by the lender is also reduced. This program shifts the borrower's position to the southeast but not necessarily on or below LOg. this may help explain why funds budgeted for the buy-down program have not been fully used.

This model of a loan transaction also enables us to examine the policy of capping interest rates on guaranteed loans. The maximum permitted rate is the average charged to the lenders' farm borrowers. If that maximum is i_m, there will be eligible borrowers having characteristics which place them just to the left of i_m and just below LOg, figure 4. Their position implies that they are less likely to succeed than borrowers who lie just to the right of i_m and above LO. Eliminating the interest rate cap may permit relatively more borrowers having a greater potential to graduate to be included in the program.[2]

---

[1] Some of the observed differences in delinquency rates are due to the rather recent origin of guarantees and the inability of FmHA to address its direct loan delinquencies expeditiously due to court and legislative actions.

[2] Some evidence that the interest rate cap may be a problem to lenders occurred at hearings before the House Appropriations Committee in late February 1990. There was testimony to,"ease the inflexible rule that the interest rate for a guaranteed loan equal the lender's average rate to all farm borrowers." (See The Agricultural Credit Letter, Vol. 5, No. 11, p. 4.)

Finally the model helps in understanding alternative policies with regard to the guarantee level. Originally the program permitted the guarantee to vary up to a maximum of 90 percent. Available evidence indicated that most loans were guaranteed at the maximum level of 90 percent (USDA; GAO 1989, p. 46). Should the guarantee level be fixed at 90 percent, as FmHA has proposed, it would encourage relatively more high than low risk borrowers to be selected. This bias could be reduced if the guarantee level were to decline as risks increases. This policy would cause LOg to more nearly parallel LO and, therefore, confine participation to those unable to get credit to those just to the left of LO. The policy would further reduce FmHA's role in farm credit markets but it would sharpen its focus of helping those who have the greatest probability of graduating from the program.

Modeling the Farm Credit Market with Direct and Guarantee Government Loan Programs

To obtain insights regarding factors affecting the choice of credit delivery modes, a different perspective is required than that provided by the micro model of borrowers and lenders. By simply comparing the government's cost of providing a direct loan to a guaranteed loan, one would conclude that the latter is a cheaper alternative because it is less costly to make and service a guarantee than a direct loan and the government's losses are limited to 90 percent. Moreover, FmHA collects an origination fee which is absent in the direct program. However, this perspective does not consider aggregate impacts of the two programs on the farm credit market. This section examines the impact of the two credit delivery systems on the farm sector. It illustrates a possible fallacy in composition, namely that what holds for a single loan does not necessarily represent the behavior of the whole system.

Models of Government Direct and Guarantee Loan Programs

Prior to any government credit program, it is assumed that the farm credit market[3] is in equilibrium as portrayed by the demand and supply schedules, figure 5A. The aim is to determine how the direct and alternatively a guarantee loan program impacts the market. Both programs provide credit to those unable to get credit at the interest rate i. By selecting those most likely to graduate from among those unable to get credit, both programs choose borrowers in the same order of creditworthiness with the result that both programs seek to meet the demand of some farm borrowers below i. To accomplish this objective both programs increase the supply of credit.

However, the supply side of the market is affected differently, reflecting the sources of funds for each program. The supply schedule for FmHA's direct farm credit program is portrayed as being perfectly inelastic. This schedule represents an authorization of size $0Q_d$ with the interest rate permitted to vary according to the government's cost of funds. Because this rate (id) does not cover loan servicing and risk costs, the rate will be lower than the market rate i and is assumed sufficiently attractive that the authorization is always used.

---

[3] In reality there are a number of farm credit submarkets but because they are linked to each other by appropriate interest rate differentials, one can refer to the whole as a farm credit market.

Combining this supply schedule with S yields Sd. The overall effect on the farm sector credit market is an increase in the credit flow to Q' from Q and a reduction in the interest rate to i'. The total credit flow does not increase by OQd because there is crowding-out of the amount $Q-Q_c$. The program's effectiveness of providing a net addition to the credit flow of the sector depends upon the elasticity of demand and supply. Given a normal downward sloping demand schedule, only if the supply schedule were perfectly inelastic would there be no crowding-out. Or, given a normal upward sloping supply schedule, there would be no crowding out only if the demand schedule were perfectly elastic. Given the rarity of these situations, it is apparent that the size of the net credit flow should be explicitly considered in program evaluation.

Guaranteed loans are made from private sources of funds and it is hypothesized that the supply schedule for guaranteed loans is more elastic than S for at least two reasons: 1) as larger numbers of less creditworthy firms receive guaranteed loans, risk-bearing costs increase, and 2) as larger amounts of guaranteed loans are made, the lender must obtain the funds by selling increasingly higher return securities or by foregoing increasingly more profitable opportunities. Penner and Silber argue that the supply function for guarantee loans may be more elastic than for other loans because of lender's increased ability to substitute guarantee for other assets in their portfolios. A sector supply schedule incorporating guaranteed loans is Sg, figure 5B. It is drawn so that the guarantee program produces the same net added credit flow and at the same interest rate as obtained by the direct program. Assuming these two models satisfactorily portray farm credit markets in the presence of FmHA, the objective is to show how they help us understand:

1. The cost-effectiveness of the alternative credit delivery models.

2. How credit program objectives impact the choice of credit delivery modes.

3. How credit and demand elasticities impact the choice of program.

Cost-Effectiveness of Direct and Guaranteed Loan Programs

I have argued elsewhere that if the authority to guarantee loans is the same as for a direct program, the net added credit flow will be less than for a direct program of identical size.[4] In effect it takes a larger guarantee program than a direct program for the sector to receive the same net added flow of credit. Therefore, if we are interested in the cost-effectiveness of the two delivery modes we should compare the cost of a larger guarantee program to that of a smaller direct program. Using some probable elasticities of credit demand and supply and estimates of cost to government for loan administration and risk-bearing, I concluded that the guarantee program is probably the cost-effective choice (Herr). However, different but still plausible elasticities could result in selection of the direct program.

---

[4] If the same amount of loan guarantees is authorized as direct loans, a new Sg would slope upward and intersect Sd at i, figure 5A or B. This represents an authorization equal to OQ_d. However, this would intersect demand at a higher rate than i' and produce a smaller net added quantity of credit than Q'.

Program Objectives, Credit Demand and Supply Elasticities and the Choice of Program

These models also show how the selection of program is impacted by program objectives and the nature of credit demand and supply schedules. Assume the aggregate farm credit supply schedule which includes loan guarantees is Sg, figure 5B. In this situation the sector receives the same net added credit flow (Q') and at the identical interest rate (i') as from the direct program. Despite delivering equal amounts of credit, the two credit programs may not be equally desirable.

First, assume the purpose of government policy is to achieve increased farm efficiency. The method to achieve this goal is through expansion of credit use. This expansion in credit use can occur at least cost to society by comparing total added surplus to government's total cost, table 2. The net cost to society of a direct program is I and for the guarantee program I'. However, the size of I and I' and therefore the selection of the least cost program depends upon the relative elasticities of the credit demand and supply schedules. When supply is relatively more inelastic than demand the direct program tends to be cheaper and when supply is relatively more elastic than demand, the guarantee program is the least cost choice, figure 6A and B.

In contrast, if the purpose of the program is to benefit farmers, a social objective, consumer surplus becomes the major, if not the only, criteria. Consumer surplus is smaller for the guarantee than for the direct program as portrayed in figure 5A and B and shown in table 2. Also, government cost is smaller for the guarantee program than for the direct program. One way to determine the cost-effectiveness of these alternative credit delivery modes is to expand (contract) the guarantee (direct) program until both programs produce the same consumer surplus. A larger guarantee program would have to intersect demand to the right of Q' (or, a smaller direct program providing the same consumer surplus as Sg would intersect demand to the left of Q'.) At some larger size of Sg consumer surplus from the guarantee program would equal that obtained from the direct program. Only when consumer surplus has been equalized would it be appropriate to compare the budgetary cost of the two credit delivery modes and choose the one with the least cost.

CONCLUSIONS

These models pertaining to the guaranteed loan program show that shifting funds from a direct to a guaranteed loan program has implications beyond the change in the delivery mode. The results from the micro models indicate that the shift, if completed, would substantially constrain and redefine FmHA's activity from that existing when credit was delivered directly. Thus what previously appeared to be underperformance seems, based on these models, to be due to real differences between the two programs.

The micro model also indicates that various attributes of the guaranteed program such as the guarantee level, interest rate requirements and cost of operating the program all impact the selection of substandard borrowers receiving guaranteed loans. Whether a guarantee program results in assisting the appropriate group

of farm borrowers among those unable to get credit elsewhere is, of course, a matter for Congress to determine.

Finally, the micro model indicates that converting borrowers currently holding direct loans from FmHA to the guarantee program is likely to be a slow and laborious process. There is evidence that recipients of direct loans are farther from the lenders' offer curve making it difficult for these loans to meet profitability and risk standards even when guaranteed.

The market models indicate that the cost-effectiveness of the direct as compared to the guaranteed loan program depend to a considerable extent on the nature of the credit demand and supply functions. Using some plausible demand and supply elasticities the guarantee loan mechanism appears to be the cost-effective choice. However, given the state of knowledge about the elasticities of credit demand and supply, reasonable alternative credit market elasticities could provide a different conclusion.

More importantly, the market models show that program selection depends upon program objectives as well as the nature of credit demand and supply elasticities. Program objectives determine whether we should maximize consumer surplus or total surplus. However, credit demand and supply elasticities alter the distribution of the components of surplus, government costs and the net cost to society. Until we can be more specific about program objectives, and know more about credit demand and supply parameters, studies evaluating FmHA credit programs will likely provide confusing and conflicting results. Hopefully these models provide a different and useful perspective for evaluating public farm credit programs.

REFERENCES

Aaron, H. J. Shelter and Subsidies, Brookings Institution, Washington, D. C.

Barth, J.R., Cordes, J. J. and Yezer, M. J. "Federal Government Attempts to Influence The Allocation of Mortgage Credit: FHA Mortgage Insurance and Government Regulations." Conference on the Economics of Federal Credit Activity, Part II--Papers. Congress and Budget Office, Special Study, September 1981

General Accounting Office. "Farmers Home Administration: Implications of the Shift from Direct to Guaranteed Farm Loans." GAO/RCED-89-86, September 1989.

Herr, William McD. "Cost-Effectiveness of Farmers Home Administration Guarantee Farm Loan Program." Paper presented at Southern Agricultural Economic Association Meeting, Little Rock, AR, February 1990.

Morehart, M. J., Johnson, J. D., Banker, D. E. Financial Characteristics of U.S. Farms, January 1, 1988. Agr. Info. Bull. No. 551, ERS, USDA, Washington, D.C.

Office of Inspector General. Farmers Home Administration Management of Farmer Program Guaranteed Loan Needs Improvement. Audit Report No. 04665-2-TC. Washington, D. C.: U.S. Department of Agriculture, September 1988.

Penner, R. G. and Silber, W. G. "The Interaction Between Federal Credit Programs and the Impact on the Allocation of Credit." American Economic Review. Vol. 63, No. 5, Dec. 1973, pp. 838-852.

Table 1. Delinquency Rate by Lender and Program, Sept. 30, 1989

	Farm Ownership	Operating Loan
Farmers Home Administration		
Direct	28.6	37.1
Guaranteed	5.7	5.1
Commercial Banks	N.A.	3.8

Sources: "Issues Surrounding the Role and Mission of the Farmers Home Administration's Farm Loan Programs," statement before the Subcommittee on Agricultural Credit, Senate Committee on Agriculture, Nutrition and Forestry by John W. Harman, Government Accounting Office, February 8, 1990, T-RCED-90-27.

Agricultural Finance Databook. Division of Research and Statistics, Board of Governors of the Federal Reserve System, Second Quarter, 1990 (p. 17).

Table 2. GAINS AND LOSSES FROM FmHA's DIRECT AND GUARANTEE FARM LOAN PROGRAMS

Source of Gain or Loss	Free Market	DIRECT PROGRAM	Net Change
Consumer Surplus	A	ABCEH + DF[1]	BCEH + DF
Producer Surplus	BCD	G	G - BCD
Total Surplus	ABCD	ABCDEFGH	EFGH
Government Cost	---	EFGHI[2]	EFGHI
Deadweight Loss to Society	---		I
		GUARANTEE PROGRAM	
Consumer Surplus	A	ABCEH	BCEH
Producer Surplus	BCD	DF'G'	F'G' - BC
Total Surplus	ABCD	ABCDEF'G'H	EF'G'H
Government Cost	---	EF'G'HI'	EF'G'HI'
Deadweight Loss to Society	---		I'

[1]DF is the amount above the direct loan rate (i_d) and below the market rate i'.

[2]Government's cost of the direct program is $(i - i_d)(Qd - O)$ or BDEF which is equal to EFGHI.