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

William Herr

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Abstract

Farmers Home Administration new farm loan activity has rapidly shifted from direct to guaranteed lending. This study determines how this change affects the farm sector and farm credit markets. Objective models constructed of these two alternative credit delivery modes indicate that a complete shift to guaranteed loans would exclude some low-income, low-risk borrowers who previously received direct loans and reduce the agency's role in the farm credit market. The study found that the guarantee program is the cost-effective choice, but this conclusion depends in part upon the elasticities of credit demand and supply. Welfare analyses show that borrowers and lenders are affected differently by the two kinds of credit programs. In order to minimize the deadweight loss to society, credit program selection must take into account the elasticity of farm credit demand and supply. The analysis also indicates that credit program selection depends upon the objectives of program.

Keywords: Farmers Home Administration, farm credit policy, guaranteed farm loans, direct farm loans, cost-effectiveness of farm credit programs.

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William Herr*

Introduction

Selective credit policies are designed to influence the distribution of credit flows to specific subsectors of the economy such as farming, housing, small business, or depressed areas. Instead of relying entirely on market mechanisms to allocate resources, selective credit programs attempt to direct markets to allocate more resources into some uses and, as a consequence, less into other uses.

The Farmers Home Administration (FmHA) increases credit availability to the farm sector. Assisted farmers are those unable to obtain credit from usual commercial sources at reasonable rates or terms and are judged capable of becoming viable. FmHA's credit mission has largely been accomplished by making direct loans. However, The Food Security Act of 1985 directed FmHA to shift to loan guarantees. The shift to loan guarantees has occurred with almost no analysis of its cost-effectiveness or how it affects the farm sector and the credit markets serving the sector.

This paper examines: (1) whether the credit delivery mode affects the number and the kinds of borrowers receiving FmHA assistance and thereby affects rural credit markets and (2) the cost-effectiveness of the guaranteed loan program compared with direct lending.

Rationale for Selective Farm Credit Programs

In a competitive financial market, interest rates are a major mechanism for allocating capital and credit among alternative

uses.   The financial market, like other markets, can be separated into many submarkets. For example, there are markets for long-term and short-term obligations, equity and credit instruments, farm and nonfarm loans, and consumer and business loans.   Participants in each market register their needs (demand) and their ability to provide funds (supply).   Interaction of demand and supply determine interest rates and the allocation of funds among submarkets and participants in each market. Disparities in interest rates between these submarkets are primarily due to differences in perceived risk, the cost of intermediation, and the liquidity of the obligation.   A given change in the demand or supply for credit in one submarket is transmitted by the interest rate throughout the system as users and suppliers seek to adjust their portfolio to the new conditions.   In efficient markets, some potential borrowers do not receive loans and some potential suppliers cannot place their funds at desired rates.   These exclusions are part of the allocative role of markets.

If the credit market were examined at any point in time, it would seem inevitable that funds would not be allocated in the way described above.   That is, situations would be observed in which interest rates and the return on capital would be higher, after adjusting for risk, cost of intermediation, and liquidity, in one market than exists in some other market.   Divergence of this nature could be expected to occur, if for no other reason, because of the time it takes for market participants to adjust to new information.   Indeed, very dynamic markets provide a recipe for almost continuous disequilibrium.   Nevertheless, a prolonged divergence is seen as an imperfection in the market.   For imperfections to persist, there must be some barrier(s) prohibiting the flow of funds among participants in the submarkets.   One possible barrier is inadequate information which results in inaccurate assessment of risks and/or returns.   This can cause limited credit flows to a subsector and cause unusually large price differentials.

Another example of an imperfection related to inadequate information is the belief that the market is capable of delivering a larger product, a better quality product, or the same product at a lower cost than is occurring.   This may arise if available technology is not being utilized.   Public credit programs which demonstrated the appropriateness of long-term amortized housing and farm loans illustrate this role for government involvement in credit markets.   These examples illustrate that selective credit programs can be used to address credit gaps caused by the high private cost of obtaining and applying knowledge.

Social objectives provide a second rationale for selective credit programs.   This role links the extension of credit to obtaining societal goals of economic growth, development, and equality of opportunity.   Credit programs justified on these grounds include those to finance synthetic fuel, waste treatment plants, soil and water conservation, farms, small business, and home ownership.

Meekhof indicates that the major rationale for FmHA is to meet social objectives, including "improvement in the chronic poverty among farm families . . . provide supervised credit primarily to low-resource farm families . . . [and] credit assistance . . . [to] poor risks" (pp. 15-16). Bosworth and others present a similar rationale. They say FmHA's credit programs "were set up to provide credit assistance for the rural poor . . . [and] marginal borrowers. The focus is on assisting a specific group as opposed to correcting credit market imperfections" (pp. 115-116). FmHA's mission statement supports these views. It directs FmHA to "serve as a temporary source of supervised credit and technical support for rural Americans for improving their farming enterprises . . . until they are able to qualify for private sector resources" (p. 1).

Given the role of financing farmers who do not meet commercial standards, those eligible for FmHA assistance can be described as being located on that part of the credit demand schedule lying just below the equilibrium rate of interest. These are viewed as the marginal borrowers with the greatest potential for becoming viable and eligible for FmHA credit. This clientele of farmers served by FmHA rapidly expanded in the late 1970's. Prior to this expansion, FmHA's share of total farm debt was 5-6 percent. Following the expansion, its market share peaked in 1987 at more than 16 percent.

FmHA's Credit Delivery Mechanisms

FmHA's credit mission has been largely accomplished by making direct and guaranteed loans. Direct loans, historically the mainstay, are made and serviced by FmHA while guaranteed loans are made and serviced by private, commercial lenders. Private lenders provide the funds, usually from local sources, for guaranteed loans while direct funds come from the government via borrowing in the Nation's money markets or from taxes. This difference in the source of funds can have an effect in local areas. This occurs because direct loans add to the area's credit supply while guarantees are apt to use the credit supply already in place in the locality. Sullivan and Herr argue that if the capability of the guarantee program is underutilized, credit supplies in a rural area could be reduced compared with that when direct lending was the credit delivery mode. The program's potential is obtained when banks, the major originator, not only use the program but adjust their mode of operation. Operational adjustments include increasing their loan-deposit ratios, substituting guaranteed loans for government securities in their investment portfolio, and selling the guaranteed portion of the loan and relending the proceeds. However, the Sullivan-Herr study found little or no evidence of these types of behavior among banks using FmHA's farm loan guarantees.

Credit guarantees enable the lender to recoup up to 90 percent of any loss of principal and accrued interest. The guarantee on accrued interest terminates within 90 days after the default occurs. The nonguaranteed portion presumably encourages the

lender to use prudent credit standards and procedures in the loan
application and servicing stages. Eligibility for an FmHA
guarantee is similar to that for farm borrowers obtaining a
direct loan, indicating that both programs are aimed at meeting
the needs of those unable to obtain credit from commercial
sources. Local lenders can be expected to make guaranteed loans
to those unable to get credit because the guarantee reduces the
burden of risk-bearing and increases the liquidity of the loan.
The latter occurs because the guarantee converts a loan of a
small, unknown firm into a primary asset which can be marketed.

Discretionary authority to guarantee farm loans was given FmHA by
a 1972 amendment to the Consolidated Farm and Rural Development
Act. According to Jurenas, loan guarantees, first issued in
1974, averaged about 8 percent of total FmHA farmer loan activity
for the period through 1984. During this period, the relative
importance of guarantees varied from less than 2 percent in some
years to more than 20 percent in the mid-1970's when they were
bolstered by the Emergency Livestock Loan Guarantee program. The
Food Security Act of 1985 included a provision which reduced
direct lending authority by exactly the amount it increased loan
guarantees through fiscal 1988 (table 1). These projections
implied that the two credit delivery mechanisms are good
substitutes. Following this legislation, guaranteed lending grew
quickly and exceeded direct lending in 1987. Budgets for recent
years show that about 75 percent of the total credit
authorizations for farmer programs are for guaranteed loans. If
some budget proposals were allowed to play out, farm lending
activity of FmHA would become entirely guaranteed.

The shift to loan guarantees is in part due to the Office of
Management and Budget's (OMB) perception that a direct or
guaranteed loan of the same size will provide the same benefit,
but costs will be lower. Costs are lower as private lenders make
and service the loan and, in case of default, government losses
are limited to 90 percent. Also, use of private lenders means
that loan terms and standards will more likely mirror market
conditions. After noting these advantages, the OMB concluded,
"direct loans should be used only when the intended degree of
subsidy cannot be achieved by the use of loan guarantees."

The growing importance of loan guarantees is evident by the
distribution of FmHA's new loan obligations in its farmer
programs. In fiscal 1982, only about 1 percent of all new loan
obligations were guaranteed, whereas by fiscal 1987 the portion
had increased to more than 50 percent (fig. 1). Studies by the
Office of the Inspector General and the Government Accounting
Office (GAO, 1989) have focused attention on the fact that the
growth of guaranteed loans was mostly due to guaranteeing
existing loans of commercial lenders rather than conversions of
existing FmHA's direct loan borrowers to loan guarantees. As a
result, more rather than less farm sector credit is influenced by
government programs.

The rapid growth of loan guarantees seemed to attest to the
effectiveness of the guarantee program. However, in the late

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1980's, symptoms emerged indicating all was not well with the
guarantee program. These included:

• Growth of guaranteed farm lending as a proportion of total
  farm loans made by FmHA stalled.

• In some years, guarantee authorizations were not fully used
  while the budget authority for direct lending was
  exhausted.

• Growth of guarantees since 1985 has largely represented the
  conversion of existing loans in lenders' portfolios to
  guarantees rather than a shift of FmHA's direct farm loan
  borrowers to guarantees.

Table 1--FmHA guaranteed and direct lending for authorized
         farm operating and ownership loan levels as allocated by
         the Food Security Act of 1985

Fiscal year	Guaranteed	Direct	Total
		1,000 dollars	
1986	2,000	2,000	4,000
1987	2,500	1,500	4,000
1988	3,000	1,000	4,000

Source: General Accounting Office, p. 11.

Figure 1. Distribution of annual farmer program
           obligations by credit delivery mechanism,
           year ending September 30
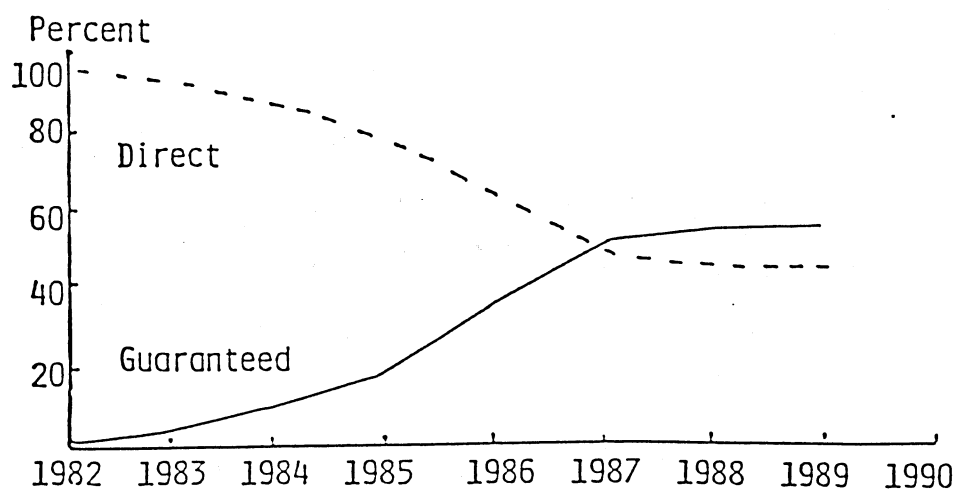
If the credit delivery modes were good substitutes, from both the borrowers' and the lenders' perspectives, many of FmHA's direct borrowers in good standing should be financed with guarantees. Thus, their use should continue to expand and authorizations should be more fully used. Some have attributed underperformance of the guaranteed loan program to prodigious amounts of paperwork and cumbersome procedures. Given the nearly 15 years of experience and changes in loan procedures during that period, it would seem that other factors may be responsible for underperformance. This study of the two credit delivery modes shows that they are imperfect substitutes and that a shift to loan guarantees:

- Reduces FmHA's role in financing those unable to get credit elsewhere.

- Probably is the cheapest alternative, but because of inadequate knowledge concerning some key variables this conclusion is by no means assured.

This paper sets forth the logic and some evidence leading to these conclusions.

A Model of the Farm Guaranteed Loan Market

Borrowing firms are perceived as having different amounts of credit risk which originate in the financial, production, and marketing environment. Lenders modify their risk exposure by adjusting loan terms such as downpayment, maturity, collateral, and loan size. The combined effect of the borrowers' risk characteristics and loan terms determines the lenders' risk associated with any loan. As these risks increase, lenders normally charge a higher interest rate. This compensates the lender for the expected higher rate of loss on more risky loans. If interest rates and risks are appropriately matched, lenders would likely receive a suitable net income for the different levels 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; Barth and others).[1] An LO curve originates at an interest rate representing the risk-free return (i) such as obtained from a government security (fig. 2). 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 rates shifts the position of LO. The slope of LO may differ among lenders because perceptions of appropriate risk-rewards vary. For example, financially weak institutions may seek higher loan rates for a given risk than sought by lenders in a stronger position. Moreover, credit risks

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[1]Lenders may wish to receive a higher net return on higher risk investments than on lower risk ones. This changes the slope of the LO curve, but does not change the logic of the model.

are likely to be perceived differently by lenders. This
perspective indicates that lenders offer an array of credit
packages from which borrowers select the one most appealing to
them.

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. Moving
up an indifference curve, the borrower transfers more risk to the
lender in exchange for paying a higher interest rate. One
example of the trade-off is the borrower's willingness to pay a
higher interest rate for a loan having a high loan-to-security
ratio. Loan contract terms and covenants can also affect
borrower preferences. Detailed loan agreements strengthen the
lender's prospects for repayment but reduce the borrower's
latitude in making production, marketing, and financial
decisions. The indifference curve reflects the borrower's
willingness to pay a higher interest rate in exchange for relaxed
loan specifications which in effect increase the lender's risk.

Figure 2. Lenders' and borrowers' preferences for
specified loan characteristics

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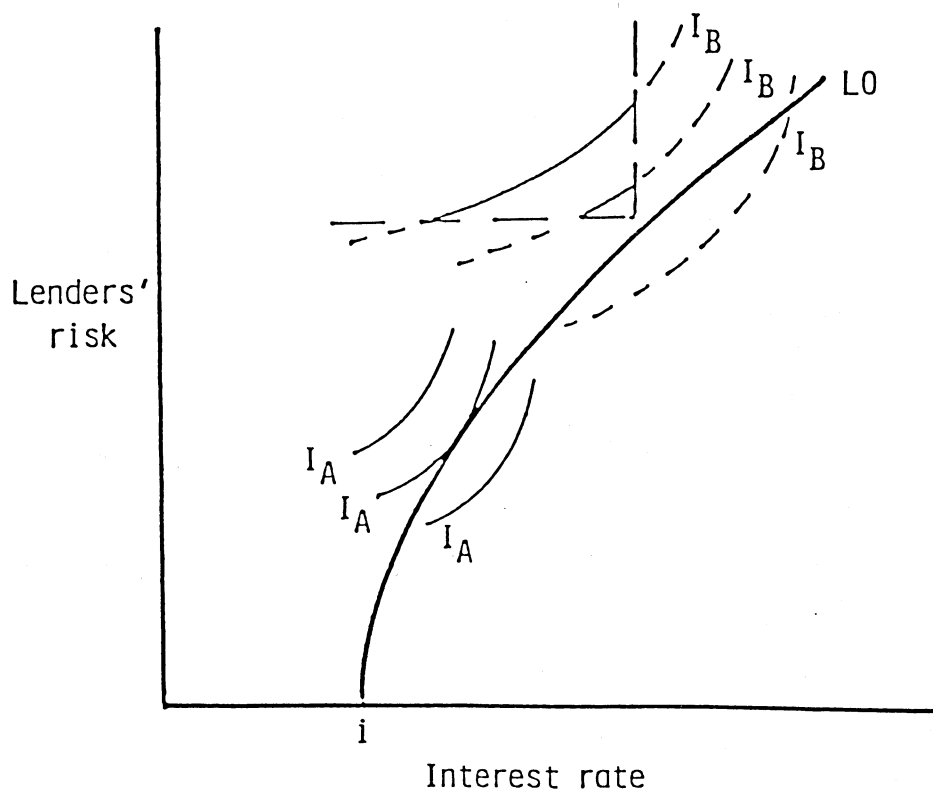
Borrowers prefer indifference curves to the left to those to the right (fig. 2). Tangency of LO and I represent optimal credit contracts to lenders and borrowers. This model of lender and borrower behavior relies on access to adequate information and competitive negotiations to reach an optimum loan contract. The model does not consider situations where imperfect information leads to credit rationing (Stiglitz and Weiss).

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 prohibit it from reaching a point on LO. Conceptually, there are many borrowers who cannot get credit elsewhere whose effective indifference maps originate as points to the left of LO.

Among borrowers who cannot 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 farther from LO. Those closest to LO have a return which almost enables them to pay an interest rate commensurate with risks as judged by commercial lenders. Or, risks are viewed as being marginally greater than the interest rate which the firm's return enables it to pay. Selecting borrowers farther 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 affects lender and borrower behavior. Initially assume a 100-percent guarantee of principle and interest. In this unlikely case, and assuming all losses are paid in a timely manner, LO may be viewed as a vertical line indicating lenders receive a sure return regardless of the borrowing firm's risk (fig. 3). 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 (fig. 4) 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 effect 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

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Figure 4. Use of loan guarantee program by three kinds of borrowers

Figure 3. Lenders' loan-offer curves for guarantees ranging from zero to 100 percent

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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: it excludes one specific group of
submarginal borrowers and generally eliminates the weakest
borrowers from among the submarginal group.

The specific group of direct borrowers excluded by the change to
guaranteed loans would be those to the left of LO and below the
intersection of LO and LOg. For example, this group may include
well-collateralized farmers who lack both the cash flow or
profitable investment opportunities to service debt at market-
determined interest rates. Thus, these farmers can be
characterized as low-risk, low-expected-profit borrowers. Data
concerning the financial characteristics of farms (Morehart and
others) indicate that a portion of FmHA 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).

The general exclusion of weaker borrowers occurs because of an
important difference between the two credit delivery modes. In
the case of the direct program, there is no limit, conceptually
at least, as to how far into the group of submarginal farmers (to
the left and above LO) this program can penetrate. However, with
a loan guarantee program, lenders will finance only those lying
between LO and LOg. Should the guarantee program accommodate all
borrowers lying between LO and LOg, lenders will cease making
additional guaranteed loans and allocate remaining funds to
alternative uses along and to the right of LO. This will occur
even though the authorization for guaranteed loans is not fully
used. 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 the change in
the guarantee program has constrained FmHA's farm lending
activity as inferred by the model. First, delinquency rates were
more than five times higher among FmHA's direct loan borrowers
than for its guaranteed loan borrowers (table 2). 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 (and hence almost meet commercial credit standards) is
that the delinquency rate for operating loan guarantees based on
dollar amount was 5.1 percent, and 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).

While these data support the model's contention that a complete shift to loan guarantees would constrain, perhaps substantially, FmHA's role in financing the farm sector, there are a number of conditions which temper the inferences which can be made from these observed delinquency rates. For example, because the courts and Congress have evolved a policy of forbearance and keeping farmers in business, delinquency rates may tend to be higher among direct program borrowers than would be the case if FmHA had been allowed to handle delinquencies more expeditiously. Thus, the delinquency rate at this point in time may be higher than for commercial lenders who have attempted to put bad credits behind them in a more timely manner. At the same time, the delinquency rate in the guarantee program may be relatively low because it may be too early for loan difficulties to have surfaced given that most of the expansion in guaranteed lending occurred in recent years.

The other piece of evidence in support of the model's inference that the guaranteed loan program constrains FmHA assistance is underutilization of the annual guaranteed loan authorization (GAO, 1989, pp. 33-34). From 1983-88, farm loan guarantees averaged 63 percent of the authorized amount and in only 1 year, 1985, did loan obligations use nearly all of the authorization (95 percent).

The conclusion from the model and available evidence indicate that should FmHA lending activity shift entirely to guaranteed lending, some lower risk, lower expected profit borrowers who have been receiving direct loans would be excluded and FmHA's role in financing farmers unable to obtain credit from commercial sources would likely be reduced.

Table 2--Delinquency rates, by lender and program, September 30, 1989

Lender	Farm ownership	Operating loan
	Percent	
Farmers Home Administration		
Direct	28.6	37.1
Guaranteed	5.7	5.1
Commercial banks	N.A.	3.8

N.A. = Not available

Sources: GAO, 1990; Federal Reserve System, p. 17.

Implications from the Micro Model about Structural Features of the Guaranteed Loan Program

The model also indicates some conditions which would help convert direct borrowers to the guarantee program, something that the GAO and USDA 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 (such as interest rate buy-down) which enable the borrower to pay a higher interest rate or reduce lender's risk. While a lower risk-free rate of return is a function of monetary policy, the other factors can be addressed by FmHA. The developing 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. A well-developed secondary market also provides the lender an opportunity to increase returns. Depending upon the service fee charged and by retaining as little as 10 percent of the loan, a lender may earn from 12 to over 20 percent on a guaranteed loan carrying a 10-percent interest rate to the borrower (ABA, p. 76). Operating efficiencies which reduce the cost of obtaining the guarantee and settling claims in case of loss also reduce the margin between i and i_g. Finally, when a lender-shared interest rate buy-down is coupled with a loan guarantee, the probability of loan repayment is increased which reduces risk but the return earned to the lender would be reduced when the lender has to match the buy-down. These simultaneous changes will not necessarily narrow the gap between the borrowers' effective indifference curve and LO_g. This may help explain why funds budgeted for the buy-down program have not been fully used. The 1990 farm act addresses this problem by allowing FmHA to buy-down interest rates without requiring the lender to reduce its rates.

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 on similar types of nonguaranteed loans. 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 (fig. 5). 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]

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[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. The program originally 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 (OIG; GAO, 1989, p. 46). FmHA's proposal to fix the guarantee level at 90 percent would permit relatively more high-risk, high-expected-profit borrowers to be financed. This increases the subsidy to this group relative to that received by low-risk, low-expected-profit borrowers. This bias could be reduced if the guarantee level were to decline as risk 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.

Issues in Measuring the Cost-Effectiveness of Federal Farm Credit Programs

Measuring the cost-effectiveness of the shift to loan guarantees requires a different perspective from that provided by the micro

Figure 5. Effect on borrower selection of an interest rate limit on guaranteed loans
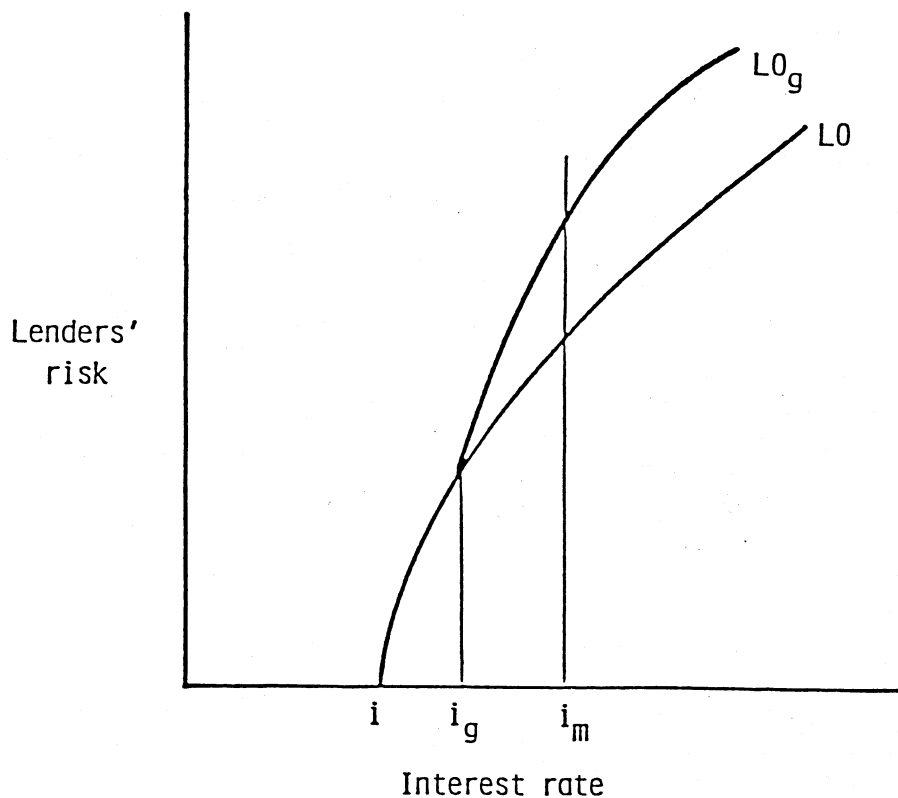
model. A simple comparison of government costs of providing a direct loan and a guaranteed loan indicates the latter reduces costs and risk exposure because losses are limited to 90 percent. Moreover, FmHA collects an origination fee which is absent in the direct program. Thus, the comparison based on individual loans indicates guaranteed lending is more cost-effective than direct lending. However, this perspective does not consider aggregate effects of the two programs on the farm credit market.

The next section examines the effect of the two credit delivery systems on the credit flows provided to the farm sector. It illustrates a potential fallacy in composition, namely conclusions based on a single transaction are not valid for the whole system. Before proceeding, however, a methodological discussion is in order.

Previous studies of public credit programs (Penner and Silber, Kaminow and O'Brien) measured accomplishments in terms of increased credit flows and the reduction in interest rates. They assumed that government is committed to provide credit to the targeted sector. The sole question addressed is which delivery mode is least costly to the government for a given increase in credit flow. This paper also follows this course for consistency with this literature, but with some reservations.

The approach omits a number of other costs. The omitted costs arise from moral hazards, adverse selection, fungibility of credit, and resource misallocation. Moral hazard occurs when lenders or borrowers take less care in assessing projects than is normal, with the result that government's risks increase. An indication of this problem is GAO's finding that prior to approving the lender's request for a guarantee there is a poor assessment of the borrower's repayment ability and insufficient verification of debt and documentation of debt (GAO, 1989, pp. 41-45). Adverse selection refers to the attraction of higher risk participants to the program. Fungibility refers to the utilization of public credit to finance nonprogrammed purposes.[3] Resource misallocation occurs because expanding credit flows to a targeted sector reduces credit and increases costs to nonprogrammed sectors. This presumably shifts the composition of investment and output from nonassisted sectors to the targeted sector.

The approach which focuses on credit flows also omits consideration of how the benefits will be distributed among affected groups. There are generally three groups affected by public credit programs (borrowers and lenders in the targeted sector and taxpayers). It is demonstrated below that direct (guaranteed) loan programs benefit borrowers (lenders) relatively

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[3]After examining the evidence concerning the effect of credit availability on housing, Meltzer indicated that one of the most neglected pieces of information concerns the extent to which "mortgage loans finance acquisitions of financial asset and real assets other than houses" (p. 777).

more. In addition, the program that imposes the lower deadweight loss on the economy is shown to depend on the relative elasticities of credit supply and demand in the targeted sector.

A final reservation is that increased credit flows for their own sake are rarely the goal of government intervention. As discussed earlier, government intervention in credit markets is justified either on the basis of market imperfections or on the basis of societal goals of economic growth, development, and equality of opportunity. Many believe that direct provision of credit is an ineffective tool for achieving either of these goals. If the primary goal is to improve credit market performance, the appropriate policy response is to enhance private competition by improving information to market participants and through antitrust or other regulatory action. If the goal is to improve economic growth, development, and equality of opportunity, the appropriate policy response is to encourage resource mobility, lower transaction costs, and improve human capital. In any case, it would be more appropriate to measure the cost-effectiveness of public credit programs against these higher order objectives rather than against credit flows. However, this step is difficult. It is easier to measure the number of farmers served or added credit dispensed than to measure market performance, added investment, increased income, or improvement in opportunity.

Nonetheless, as in previous studies of public credit programs, it is assumed here that government is committed to provide credit to the targeted (farm) sector. Therefore, the appropriate question is which delivery mode is least costly to the government. Following this analysis, some consideration is given to the effect of the direct and guaranteed loan programs on increasing borrowers' consumer surplus in the target sector and minimizing deadweight loss to the economy.

**The Effect of Direct and Guaranteed Loan Programs on Credit Flows**

Prior to any government credit program, the farm credit market[4] is assumed to be in equilibrium as portrayed by the demand and supply schedules (fig. 6). The aim is to determine the market effects of the direct and the guaranteed loan program. Both programs provide credit to those otherwise unable to get credit at the market-clearing interest rate, i. By selecting from this group those most likely to improve their financial position, both programs choose borrowers in the same order of creditworthiness. Thus, both programs seek to meet the demand of some farm borrowers below i. To accomplish this objective, both programs increase the supply of credit to the farm sector.

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[4]There are really 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.

However, because each program has a different source of funds, the supply side of the market is affected differently. The supply schedule for FmHA's direct farm credit program is portrayed as being perfectly inelastic, Q_d. This schedule represents an authorization of size OQ_d with the interest rate permitted to vary according to the government's cost of funds. Because this rate 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. Combining this supply schedule with S yields Sd. The overall effect on the farm sector credit market is to increase the credit flow to Q' from Q and to reduce the interest rate to i'. The total credit flow does not increase by OQ_d because there is crowding out of the amount $Q - Q_c$. The program's effectiveness in 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. Thus, the size of the net credit flow must be considered in program evaluation.

Figure 6. Effect of a direct loan program on the credit market
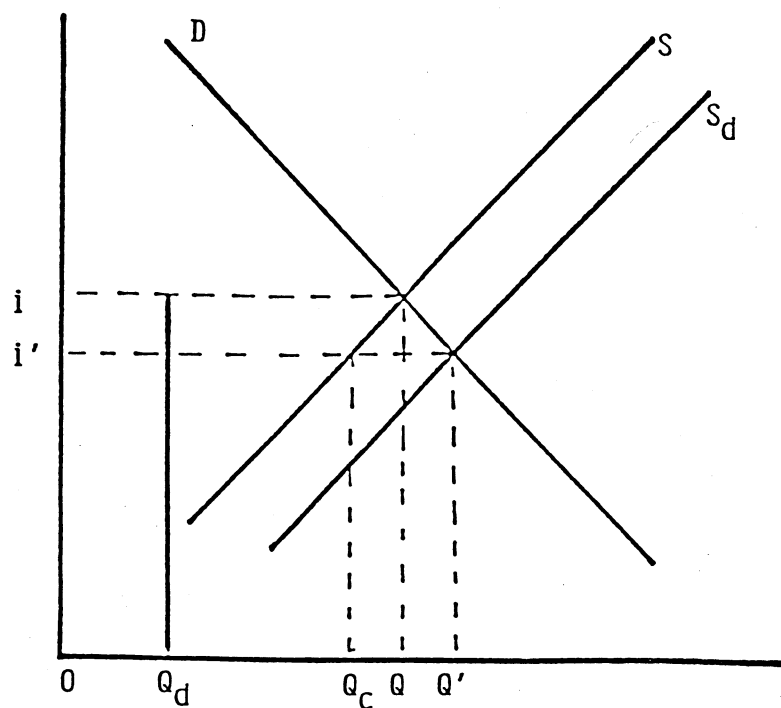
Guaranteed loans are made from private sources of funds and are
attractive to lenders because they reduce the cost of
risk-bearing and increase liquidity. The latter occurs because
the loan of a small, unknown firm is converted into a marketable
asset. A supply schedule for guaranteed loans has a positive
slope 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 forgoing 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 lenders' increased ability to substitute
guarantees for other assets in their portfolio.

Interest rates on guaranteed loans cannot exceed the average rate
charged by the lender on similar loans to its nonguaranteed
borrowers. If it is also assumed that the maximum authorization
is the same as for the direct program, the supply schedule for
government guarantees is portrayed by G (fig. 7). The addition
of G to S gives the combined schedule S_g. Demand intersects S_g
such that a smaller net addition to the sector's credit flow is
provided than under the direct loan program. This occurs because
the shift in the supply schedule reduces interest rates which in

Figure 7. Effect of a guaranteed loan program
on the credit market

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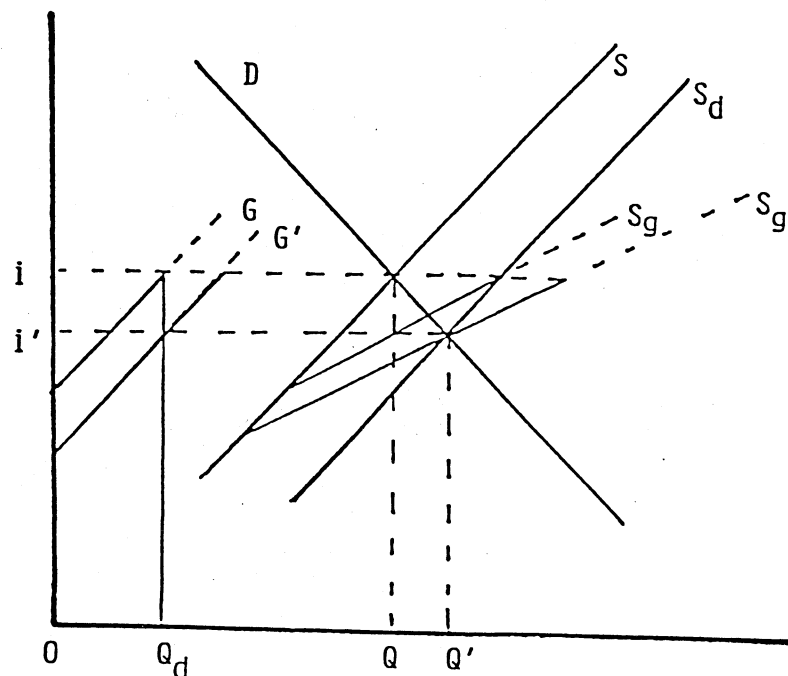
turn reduces the amount of guaranteed loans lenders are willing to make (a movement along G) and causes some crowding out. This crowding out reflects a movement along S. It may also represent a decrease in S as lenders shift loan funds to the guarantee program. If the guarantee program is to provide the same net credit flow to the sector as the direct program, it must be more attractive to lenders. A combined supply schedule providing this level of credit flow is Sg'. This represents a shift in the supply schedule of guarantees from G to G'. To achieve this increase, parameters of the guarantee program would have to be altered. Among program features which would help accomplish the desired increase are: higher guarantee levels, reduced cost of obtaining and administering the loan, and improved ability to market the guarantee portion of the loan.

How attractive a guarantee program must be to provide the same net added credit flow to the sector as accomplished by the direct program depends in part upon the elasticities of the guaranteed loan supply schedule. For example, consider a more elastic schedule for guarantees than shown by G in figure 7. Such a schedule would originate at a higher rate and intersect i at Qd, reflecting the same authorization as for the direct program. This new combined supply schedule intersects demand farther to the left. This indicates that as the supply elasticity of guarantees increases, the required size of a guarantee program which provides the same amount of added credit as the direct program would have to be larger. This comparison of relative supply elasticities for guaranteed loans holds so long as they cross i at Qd or any other common interest rate above i'. However, if they cross Qd at different points, then elasticities will not be sufficient to judge their relative effects on credit flows.

This model shows that compared to a direct program it takes a larger guarantee program to provide the same added credit flow to the farm sector. In order to determine which credit program is cost-effective, it is first necessary to estimate the size of a guarantee program which provides the same net added credit flow to the sector (Q') as a direct program. The important factors needed to make this determination are the elasticity of the credit demand and supply schedules as well as the parameters of the guarantee program needed to induce lenders to utilize the program. After equating credit flows, one's second step is to estimate the government's total cost of the guarantee program and the total cost of the direct loan program. The program having the lowest total cost is the cost-effective choice.

The next section presents estimates of the cost-effectiveness of the two delivery systems. The result captures the direct government costs of loan administration, risk-bearing, and the effect of crowding out but omits other costs identified at the beginning of this section. If it is assumed that these other costs are the same for the two credit delivery systems, their omission does not affect the choice of programs but it does result in an overstatement of the effectiveness of Federal farm credit programs.

Cost-Effectiveness of Guaranteed and Direct Loan Programs

Conceptual and measurement problems associated with the costs of Federal farm credit programs have been discussed by the GAO (1979), Lieblich, and Bosworth and others. All identified the cost to government and the benefit to borrower approaches for measuring credit subsidies. GAO defined the cost approach "as the difference between program costs to the Government and the charges made to beneficiaries." The benefit approach was defined "as the difference between what the borrower pays for the Government loan and the price that he/she would have paid to an efficient, competitive private lender." In a perfect market, the two approaches would provide identical measures of the subsidy.[5] The cost approach has some advantages because identified items are akin to Federal budget outlays and the approach avoids the difficult problem of determining the rate which private lenders would charge on loans to borrowers unable to get credit elsewhere. Despite this, the OMB suggests that the benefit approach be employed to justify Federal intervention in credit markets.

Hughes and Osborn used the cost approach to compute the total amount of credit subsidies received by the FmHA and the Cooperative Farm Credit System. They provided separate estimates for three components of the government's cost of delivering credit: administration, risk-bearing, and funding. The GAO computed the subsidy involved in FmHA lending using the cost approach and the same three cost components. However, GAO's analysis applied to a typical loan in selected FmHA programs while the Hughes-Osborn estimates applied to FmHA's aggregate portfolio of real estate and nonreal estate loans. Bosworth and others updated the GAO study in computing the subsidy costs of FmHA loans made in fiscal 1984.

A characteristic of FmHA's direct loan program important to this study is that in some years these loans have been made, though with important exceptions such as with limited resource borrowers, at rates equal to the government's cost of acquiring funds. Assuming this pricing policy was in effect for FmHA's operating loan and farm ownership loans, the subsidy provided by government is limited to that associated with loan administration and risk-bearing. Credit guarantees involve the same two subsidy elements as funds from the private sector.

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[5] Consider the following illustration for a loan made by a government credit agency at 10 percent. Assume full and complete information about the loan is presented to a commercial lender. The lender responds that the loan would be made at a 15-percent rate. The subsidy by the benefit approach is 5 percent. Alternatively, with full and complete information, it is estimated that the cost to government of funding the loan is 8 percent, administrative costs are 2 percent, and risk-bearing costs are 5 percent. The total cost to government is 15 percent. As the government credit agency charges 10 percent, the calculated subsidy is 5 percent.

The Farm Ownership Program

In 1981-85, the farm ownership program provided an average annual gross credit flow of about $730 million to the farm sector. This amount can be looked upon as increasing the supply of farm credit, reducing farm mortgage interest rates, crowding-out some previous suppliers, but providing a net increase in the manner of figure 6. Estimates of crowding-out require information about the elasticities of demand and supply of farm mortgage credit. Evidence about elasticities is old, sparse, and diverse (Montgomery and Herr, Lins, Hesser and Schuh). Judgment based on these studies suggests elasticities of -1.0 for demand and 1.5 for supply. These imply a net annual credit addition of about $290 million and crowding-out of about 60 percent of FmHA's original credit flow.[6] When related to the total annual credit flow, estimated to be about $10 billion of non-FmHA lending, crowding-out is 4.4 percent.[7]

Two estimates of the cost to government of direct farm ownership loans are available. The GAO estimated two components of costs, administration and default, relative to an initial loan. Assuming that farm ownership loans are amortized over a 20-year period and the same volume of loans is made annually, outstandings would peak in 20 years and then stabilize. In this static environment, GAO's estimate of administrative and risk-bearing costs total nearly 5 percent of the volume of loans made annually. Cost of funds is ignored as it is assumed that loans are made at a rate which equals the cost to government, hence no subsidy occurs for this component.

Hughes and Osborn estimated the subsidy associated with FmHA's real estate debt portfolio using the same conceptual framework. Their estimates pertained to a different time period and used different judgments for estimating the two cost components. Dividing the Hughes-Osborn estimates of administrative and risk-bearing costs by the actual volume of loans made in 1981-85 indicates costs averaged about 13 percent. Their estimates should be higher than GAO's for at least two reasons: (1) default costs were judged to be negligible by GAO but were building to a substantial amount by the time of the Hughes-Osborn study, and (2) FmHA's loan portfolio was increasing during the

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[6]Alternative assumptions about demand and supply elasticities ranging from ±.5 to ±1.5 produce estimates of crowding-out of 25-75 percent.

[7]This estimate assumed an annual non-FmHA credit flow of $10 billion per year, at an average interest rate of 10 percent. Based upon the assumed elasticities of demand and supply, the added gross flow of farm ownership loans of $730 million results in a new equilibrium (i', Q') at 9.72 percent with an annual credit flow of $10.29 billion. The net gain of $290 million implies crowding-out of $440 million dollars or 4.4 percent of non-FmHA credit. It also implies that the gross flow of FmHA credit is only 40-percent effective ($290 million/$730 million).

period of the Hughes-Osborn study. Both cause higher administrative costs than would occur in the static model using GAO's data. Bosworth and others updated the GAO study and estimated the present value of the subsidy in the farm ownership program as being 22 percent of the 1984 loan volume, but this includes some amount for the cost of funds. The Hughes-Osborn estimates were relied upon as they are believed to be more realistic than those based on the older GAO estimates.

The total cost of the direct farm ownership program is $95 million under these assumptions (table 3). In terms of the gross annual credit flow of $730 million, costs average $0.13 per dollar loaned. However, because of crowding out it is estimated that this represents only $290 million of new mortgage credit in the farm sector. Thus, in terms of the annual net addition, the cost is $0.33. Because costs are frequently stated in terms of outstanding loan volume, these ratios are also presented. Relative to FmHA's outstandings of farm ownership loans, the cost is about 1 percent but, relative to the net addition to the sector's outstandings, the cost is about 3 percent.

The next task was to estimate the size of a guarantee program which provides the same net addition ($290 million) to the sector's credit flow as accomplished by the direct program. First, it was assumed the shift to a loan guarantee program caused an increase in the elasticity of the credit supply schedule to 2.0 from 1.5. To achieve identical results as the direct program, the supply schedule associated with the guarantee program must intersect demand at i', Q' (fig. 7). Moving up Sg' (elasticity 2.0), a quantity consistent with the original equilibrium rate i is found. This is the estimate of the gross size of a guarantee program ($880 million, column 2, table 3) which provides the same net credit addition to the sector as obtained by the direct program. Under these circumstances, the guarantee program would be about $150 million, or about 20 percent larger than a direct program.

If we assume loan losses are the same per dollar loaned and the FmHA must reimburse these losses at 90 percent, total risk costs increase but not as much as the increase in program size. Administrative costs are projected to decline because it is assumed that $4 of loan guarantees can be handled for every $1 of direct lending. Under these assumptions and allowing for the 1-percent origination fee, the guarantee program is more cost-effective to government than the direct program. However, if the elasticity of credit supply associated with the guarantee program were 3.8 (column 3) and other assumptions remain the same, total costs of the guarantee program would be about the same as the direct loan program.[8]

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[8]As the guarantee program increases in size, the loss rate would likely increase. This higher loss rate is not reflected in tables 3 and 4.

Table 3--Estimated credit delivered and related costs for a direct and guarantee farm ownership program for alternative market situations

Item	Direct	Guarantee	
		Coefficient	
Credit market situation:			
Elasticity of demand	-1.0	-1.0	1.0
Elasticity of supply	1.5	2.0	3.8
		Million dollars	
Program size	730[1]	880	1,380
Net addition	290	290	290
Outstanding, total	7,655	9,555	15,000
Added	3,150	3,150	3,150
Program costs:			
Funding cost[2]			
Admin. and operation[3]	44	13	21
Risk-bearing[4]	51	55	87
Total	95	68	108
Less: origination fee[5]		8	12
Net costs	95	60	96
		Dollars	
Annual costs per dollar:			
Total credit flow	0.130	0.068	0.070
Net credit flow	.328	.207	.331
Total outstanding	.012[6]	.006	.006
Net outstanding	.030	.019	.030

[1]Average 1981-85.

[2]Assumes no funding cost to the government. For the direct program, loans are made at rates equal to government's cost of acquiring funds. For the guarantee program, loans are made by private lenders.

[3]$0.06 per dollar of gross loans made. Assumes $4 of loan guarantees can be administered for each $1 of direct lending.

[4]$0.07 per dollar of gross loans made. Loan guarantees at 90 percent.

[5]Not applicable for direct loans and 1 percent of guaranteed amount.

[6]Hughes-Osborn estimate for 1981-85 is $0.010.

The Operating Loan Program

The annual gross flow of operating loan credit averaged $2.125 billion in 1981-85 (column 1, table 4). If we assume the demand for this type of credit was more inelastic (-.5) than for farm ownership loans while the supply elasticity is the same, the net addition to the sector's nonreal estate credit flow would be on the order of $530 million, indicating crowding-out of $1.595 billion or about 75 percent of FmHA's original gross credit flow. When related to the total non-FmHA credit flow, estimated to be about $30 billion, crowding-out is 5.3 percent.[9]

GAO estimated the administrative and risk-bearing costs associated with a typical operating loan over its 7-year life as 4.3 percent of the gross credit flow. Funding costs were ignored because it is assumed that these loans are made at rates equal to the government's cost of borrowing. Risk-bearing costs were low as the study was done prior to the period of financial stress. The Bosworth and others estimates show the present value of the subsidy to be 12 percent of the annual loan volume in 1984.

Hughes and Osborn estimated the combined direct costs for FmHA's operating, soil and water, emergency disaster, and economic emergency loan programs. Excluding funding costs, their cost estimates for the two components averaged about 26 percent of the actual annual volume of loans made from 1981-85. This ratio is high compared with the GAO study for several reasons. It contains the continuing program costs associated with the economic emergency program though the program has expired, default costs are high because it includes some years of financial stress, and the estimate pertains to a group of programs, which include emergency programs with higher delinquency rates than for other FmHA programs. Rather than relying on either study, I averaged the costs from these two sources and used the averages to represent the cost to government of the operating loan program.

Based on the average of the two studies, administrative and risk-bearing costs are, respectively, $0.045 and $0.111 per dollar of loans made, and total costs of a direct loan program are $332 million (table 4). The size of a guarantee program which provides the same net addition ($530 million) to the sector's nonreal estate credit flow when the elasticity of supply increases to 2.0 from 1.5 is about $2.650 billion. Procedures and assumptions for estimating administrative and risk-bearing

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[9]This estimate assumed an annual non-FmHA gross credit flow of $30 billion per year, at an average interest rate of 10 percent. Based upon the assumed elasticities of demand and supply, the added gross flow of operating loan credit of $2.125 billion results in new equilibrium (i', Q') at 9.67 percent with an annual credit flow of $30.530 billion. The net gain of $530 million implies crowding-out of $1.595 billion or 5.3 percent of non-FmHA credit. It also implies that the gross flow of FmHA credit is only 25 percent effective ($530 million/$2.125 billion).

Table 4--Estimated credit delivered and related costs for a
direct and guarantee farm operating loan program for
alternative market situations

Item	Direct	Guarantee	
	Coefficient		
Credit market situation:			
Elasticity of demand	-0.5	-0.5	-0.5
Elasticity of supply	1.5	2.0	2.6
	Million dollars		
Program size	2,125[1]	2,650	3,250
Net addition	530	530	530
Outstanding, total	6,375	8,100	10,080
Added	1,500	1,500	1,500
Program costs:			
Funding cost[2]			
Admin. and operation[3]	96	30	37
Risk-bearing[4]	236	265	325
Total	332	295	362
Less: origination fee[5]		24	29
Net costs	332	271	333
	Dollars		
Annual costs per dollar:			
Total credit flow	0.156	0.102	0.102
Net credit flow	.626	.511	.628
Total outstanding	.052[6]	.033	.033
Net outstanding	.221	.181	.222

[1]Average 1981-85.

[2]Assumes no funding cost to the government. For the direct
program, loans are made at rates equal to government's cost of
acquiring funds. For the guarantee program, loans are made by
private lenders.

[3]$0.045 per dollar of gross loans made. Assumes $4 of loan
guarantees can be administered for each $1 of direct lending.

[4]$0.111 per dollar of loans. Loan guarantees at 90 percent.

[5]Not applicable for direct loans and 1 percent of guaranteed
amount.

[6]Hughes-Osborn estimate for 1981-85 is $0.080.

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costs are the same as for the farm ownership program. In these circumstances, the guarantee program is cheaper than the direct program. However, if the supply elasticity increases to about 2.6, the total cost of the alternative delivery systems would be virtually the same (column 3, table 4).

Implications from the Credit Flow Model for Farm Credit Policy

The market model and results indicate that the cost-effectiveness of the direct compared with the guaranteed loan program depends to a considerable extent on the nature of the credit demand and supply functions. Using some plausible demand and supply elasticities, one finds that the guaranteed 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.

Budgeted results pertaining to program selection indicate that knowledge of credit demand and supply elasticities is at least as important and probably more so than measure of some components of program costs. The results indicate crowding-out to be a major item determining the cost-effectiveness of Federal farm credit programs. If these are ignored, program selection and use can substantially depart from optimum. This is shown by the large differences in cost depending upon whether subsidies are expressed as a ratio to total gross credit flows (outstanding) provided by the program or by the net added credit flows (outstanding) provided to the sector. Hughes and Osborn, GAO, and Bosworth and others all compare program cost relative to the gross measures. By not relating costs to net added credit flows to the sector (that is, ignoring crowding out), they portray the cost of credit programs as being lower than they actually are which in turn tends to encourage their use.

One may be tempted to examine the effectiveness of the farm ownership relative to the operating loan program by comparing the ratio of costs per dollar of net credit flow. Such a comparison assumes that one dollar of additional farm ownership and operating loans provides equal benefits. This, of course, may not be true. It underscores the importance of the need to translate credit delivered to higher order objectives of increased farm output, efficiency, income, and/or viability of farm units. This step is difficult as there is no satisfactory link between credit flows and interest rates and these higher order objectives (Kaminow and O'Brien). Studies which measured program accomplishments in these terms include Hughes, Penson, and Bednarz who examined the effect of subsidized credit on farm

ownership[10] and wealth and Mehdian and others who examined the change in overall farm efficiency of those participating in FmHA's credit programs. However, none of the reviewed studies juxtaposition these benefits with costs.

It is interesting to speculate about the impact of the development of a secondary market for guaranteed loans on the effectiveness of the guarantee program. One effect is that the elasticity of S_g increases with the result that program effectiveness is reduced relative to a direct program. However, the secondary market also reduces the cost of such loans, causing S_g to shift downward which improves the effectiveness of the program. Thus, <u>a priori</u>, one cannot judge the effect of the development of a secondary market. Penner and Silber make a similar point, "Since the mortgage characteristics programs change the slope of the supply curve as well as shifting it, one cannot make any simple statement about . . . the efficiency of these programs . . . ." (p. 844).

Effect of Direct and Guaranteed Loan Programs on Borrowers' Consumer Surplus and Overall Economic Efficiency

The forgoing analysis is predicated on defining benefits in terms of the amount of added credit delivered to the sector. As discussed at the beginning of this section, alternative views of program accomplishments and costs can be derived from welfare measures. The purpose of this section is to demonstrate how program objectives and the elasticities of credit demand and supply schedules can affect the choice of credit delivery mode. Assume the sole purpose of a Federal farm credit program is to benefit farm borrowers. This benefit is measured by the increase in consumer surplus in the farm loan market. Prior to a government farm credit program, the farm credit market is in equilibrium at interest rate i and a loan volume of Q (fig. 8A). A direct loan program is introduced of size OQ_d and loans are made at an interest rate of i_d. Prior to the direct credit program, consumer surplus is A. With the program, interest rates fall to i' and consumer surplus is ABCEH plus DF. The last component is the direct benefit to farmers receiving the government subsidized loan.

Alternatively, a loan guarantee program providing the same net added credit flow, Q', to the sector is used (fig. 8B). Consumer surplus from this program is ABCEH which is a smaller benefit, by the amount DF, than obtained by the direct program. Therefore,

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[10]Adjusting Hughes, Penson, and Bednarz results to reflect only the effect of FmHA's farm ownership program indicates that the program increased farmer ownership of land by less than 0.1 percent. After making allowance for farm ownership loans not used to purchase real estate (refinancing and improvements), I find these estimates of net added farm mortgage credit also show that longrun gain in farmer ownership due to the FmHA program to be less than 0.1 percent.
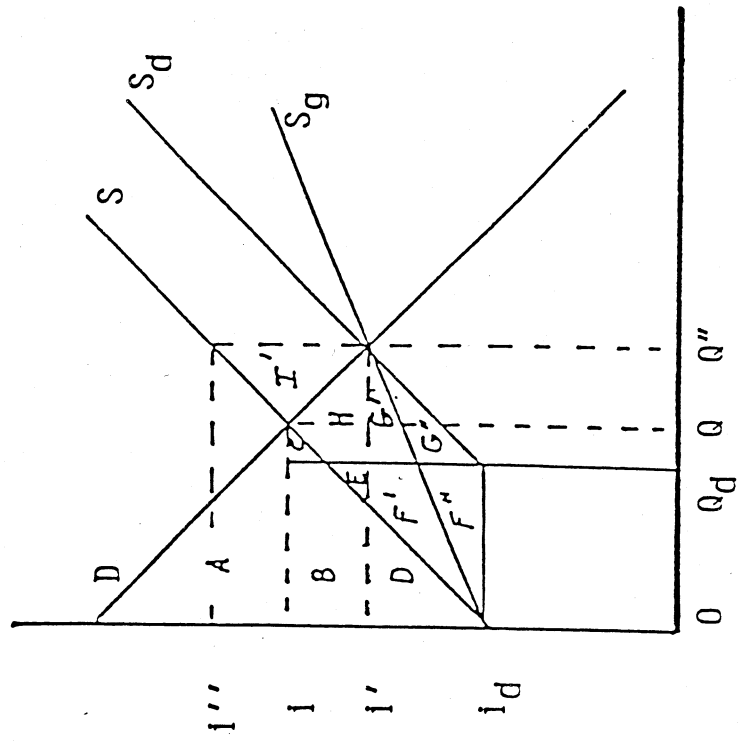
Figure 8. Comparison of measures of surplus for direct and guaranteed loan programs

Panel A. Direct loan program
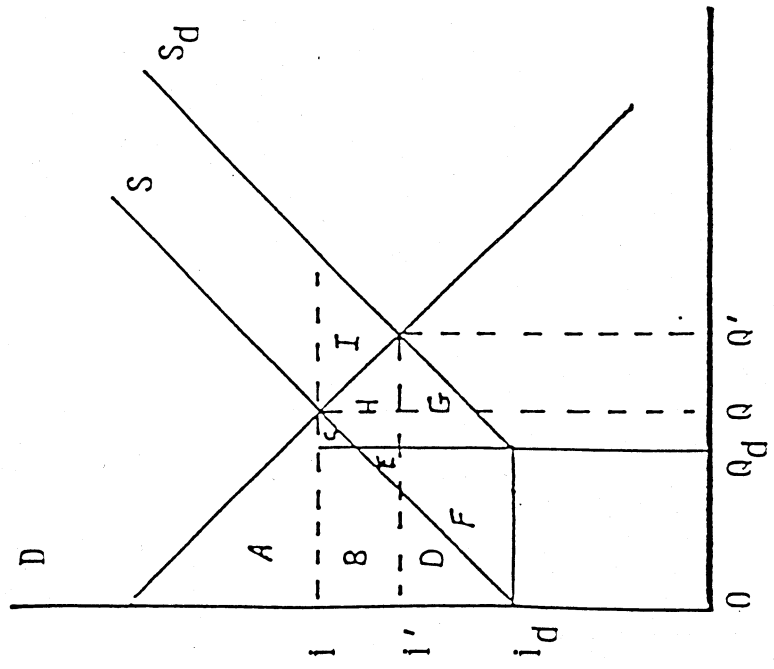
Panel B. Guaranteed loan program

when both programs deliver the same added amount of credit to the farm sector, farm borrowers would prefer the direct loan program to the guarantee program. On the other hand, lenders would prefer the guarantee program. Producer surplus associated with the direct program is G (fig. 8A), whereas for the guarantee program, it is the larger area DF'G' (fig. 8B).

An appropriate goal is to provide these benefits to farm borrowers at the lowest cost to government. However, if benefits, as measured by consumer surplus, are not equal, it may be inappropriate to select the credit delivery mode which incurs the lowest cost to government. Instead, this analysis indicates that a larger guarantee program is required to provide the same benefits to the sector as accomplished by a direct program of some specified size. Only after they are adjusted to produce the same consumer surplus would it be fair to compute the total cost to government and select the least costly program.

Broader objectives for the credit program may indicate that the appropriate measure of the benefit is the increase in total surplus rather than consumer surplus. Assuming this is the case, total surplus increases by EFGH for the direct program and EF'G'H for the guarantee program (figs. 8A and 8B, respectively). The associated cost of the direct program is BDEF. This is the difference between the market rate i and the direct loan rate, i_d, multiplied by the direct loan volume OQ_d. The area is also equivalent to EFGHI, leaving a net cost or loss of efficiency from the direct program of I (fig. 8A). The cost of the guarantee program is EF'G'HI'. This area represents the difference in the cost of providing credit by the commercial sector, measured along S, compared with the cost of providing the same amount of credit when loan guarantees are available, measured along S_q. For example, commercial lenders would supply Q' at a cost of i" but the availability of guarantees reduces this cost to i'. The net cost of the guarantee program is I' (fig. 8B).

However, the relative size of I and I', the net loss to society of the direct and guaranteed loan program, respectively, depends upon the relative elasticities of the credit demand and supply schedules. When supply is relatively more inelastic than demand, the area I is small compared with I'. And, if supply is relatively elastic compared with demand, I' is small compared with I (figs. 9A and 9B).

Conclusions from this approach show that borrowers and lenders are affected differently by the two kinds of credit programs and in order to minimize the deadweight loss to society, credit program selection must take into account the elasticities of farm credit demand and supply. The welfare approach can also help focus on the broader question of how government credit programs compare with alternative programs in providing aid to the farm sector. An examination of this question, however, is beyond the scope of this paper.

Figure 9. Effect of relative elasticities of credit supply and demand schedules on deadweight loss to farm credit market participants of a direct and guaranteed farm loan program

Panel A

Panel B

I' Left of the vertical.
Deadweight loss of
guarantee program.

I Below the horizontal.
Deadweight loss of
direct program.
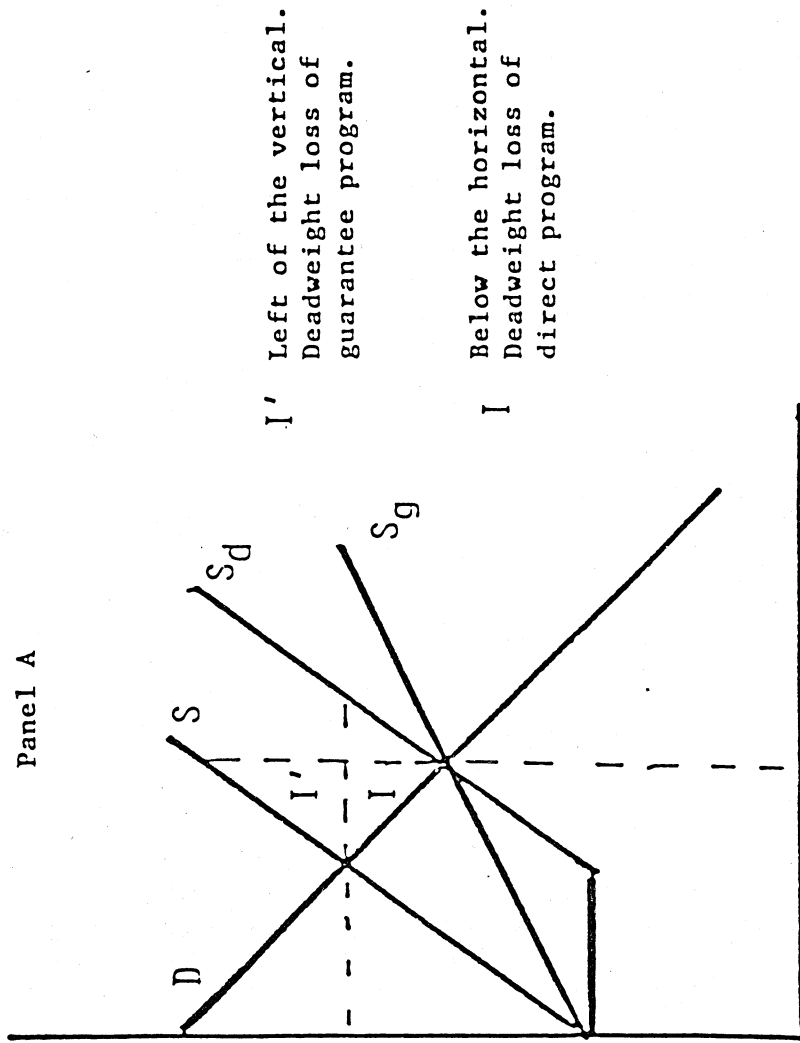
Conclusions

These models pertaining to shifting from a direct to a guaranteed loan program have implications beyond the change in the delivery mode. The results of the micro model indicate that the shift, if completed, would exclude some low-income, low-risk borrowers and reduce the agency's role in the farm credit market. Whether a guarantee program results in assisting the appropriate group of farm borrowers among those unable to get credit elsewhere is a matter for Congress to determine. The model also indicates that various attributes of the guarantee program, such as the guarantee level, interest rate requirements, and cost of operating the program, all affect the selection of substandard borrowers receiving guaranteed loans.

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. Conversions to the guarantee program will occur as interest rates decline, the operating efficiency of the program is improved, and possibly with FmHA technical and debt assistance. Conversions could also possibly be increased by subsidizing lenders. Developing an active secondary market in guaranteed loans may help as this would enable lenders to increase their returns.

The market model found the guarantee program is the cost-effective choice but alternative credit market elasticities might provide a different conclusion. Welfare analysis indicates that the selection of the credit delivery mode depends upon credit demand and supply elasticities. This analysis also indicates that credit program objectives interact with those market parameters and thereby affect program selection. If the supply schedule is relatively inelastic compared with demand, selection of a direct program has a smaller deadweight loss to credit market participants than a guarantee program. On the other hand, if the supply schedule is more elastic relative to the demand schedule, selection of a guarantee program will cause the smallest loss to market participants.

All studies estimating the cost to government of public farm credit programs, including this one, have ignored some implicit costs. While it is possible that they may be similar when comparing direct and guaranteed programs, their omission understates total costs and thereby encourages the use of public credit.

The decline in farm financial stress should provide an opportunity to shift research resources from those problems toward evaluation of public farm credit programs. These models provide a beginning toward an evaluation which has been ignored too long by the agricultural finance research agenda.

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