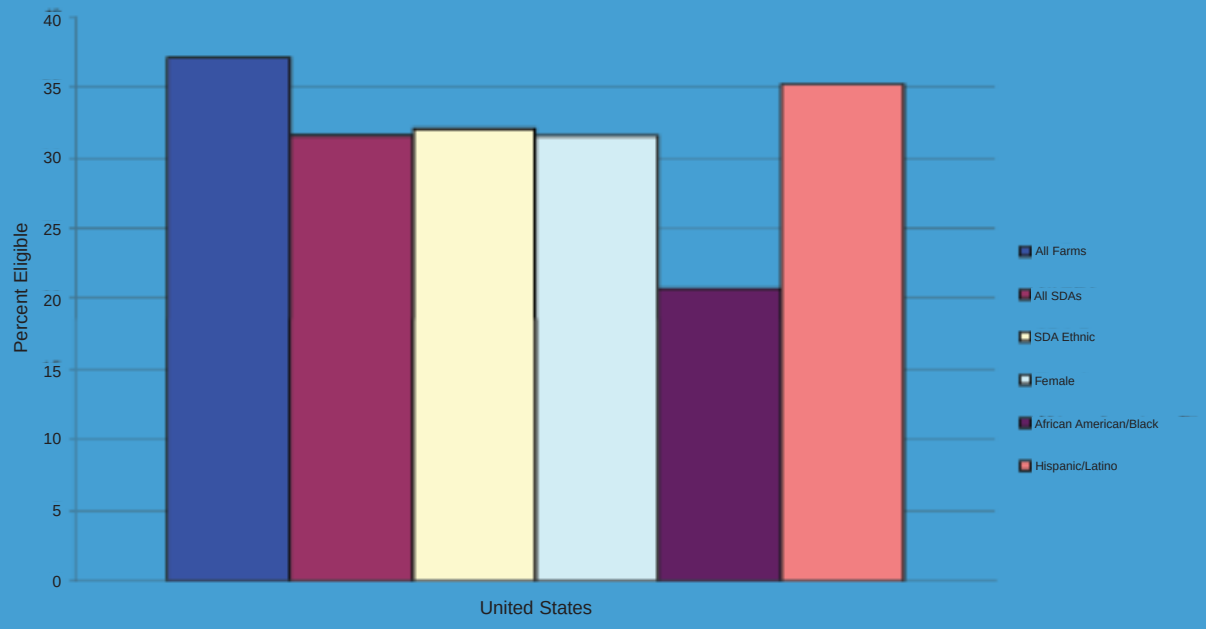
Farm Service Agency Direct Farm Loan Program Effectiveness Study



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Foreword

This is the final report on the project titled "Farm Service Agency Direct Farm Loan Program Effectiveness Study" funded through Cooperative State Research, Extension, and Education Service (CSREES) award number 2004-39528-14476 between the Farm Service Agency (FSA) and the Department of Agricultural Economics and Agribusiness at the University of Arkansas, Division of Agriculture, Fayetteville.

The first part of the report focuses on Objective 1 of the study, which is to identify groups being served by FSA Direct Farm Loan Programs. This objective is concerned with how consistently FSA is serving its various targeted groups relative to its mission. The second part of this report discusses the results of Objective 2, which examines the length of time borrowers remain in the FSA Direct Farm Loan Programs and how frequently direct borrowers "graduate" to conventional sources of credit. Part three of the report considers Objective 3, which measures and examines ways of reducing loan subsidy rates. The scope of Objective 3 is limited to identifying ways to lower loan reorganization and default costs.

In accordance with the contract stipulations for the funding of this project, a preliminary report was submitted to FSA on July 29, 2004. Partial findings on Objective 1 were given in the preliminary report. The present report revises some of the findings in the preliminary report and provides additional findings. Charles Dodson and Steven Koenig of FSA provided comments on the preliminary report and a draft of the final report. Many of their comments have been incorporated into this report.

Data from the National Agricultural Statistics Service (NASS) and the Economic Research Service (ERS) Agricultural Resource Management Survey (ARMS) provide vital information for this study. Farm population counts from NASS and detailed financial characteristics of FSA loan recipients by relevant groupings from the ARMS were vital to this study. We acknowledge the assistance of James Burt of NASS and Charles Dodson of FSA in obtaining Census of Agriculture data. We acknowledge and extend our appreciation to Robert Dubman of ERS who has been extraordinarily helpful in processing the memorandum of understanding (MOU) between the ERS and the University of Arkansas, in constructing data sets used by the research team at the Arkansas Agricultural Statistics Office in Little Rock, Arkansas, and also in providing statistical computations that eased the team's computational burdens. We thank Charles Dodson and Steven Koenig of FSA for their guidance and assistance at various stages of the project. The team also wishes to thank Ben Klugh and Doug Rundle of the Arkansas Agricultural Statistics Office who provided expertise, access, and a work environment conducive to analysis of the ARMS data set in their Little Rock offices. Edward Gbur and Kevin Thompson of the University of Arkansas Division of Agriculture provided much-appreciated statistical expertise. Many FSA personnel provided help in this study. In particular, we thank Connie Holman, Charles Dodson, Steve Koenig, Kathleen Miller, Lonnie Ewing, Rebecca Carpenter, Veldon Hall, Ed Zera, Jim Bolego, and Ellen Sachs and her DLPESA group who coordinated and implemented the FSA borrower survey. We also thank Nan Ma, our graduate research assistant, for preparing the GIS maps and other technical assistance. The technical editing provided by Camilla Romund is appreciated. Responsibility for errors in analysis and interpretation of findings lies solely with the research team.

Executive Summary

This final report presents the results of an independent, performance-focused review of the effectiveness of Farm Service Agency (FSA) Direct Farm Loan Programs (FLPs) as requested by the Office of Management and Budget (OMB) in the 2005 Passback for FSA. The study focuses on FSA's direct Farm Ownership (FO), Farm Operating (OL), and Emergency (EM) loan programs.

The study has three major objectives: (1) identify groups being served by FSA Direct Farm Loan Programs, (2) examine the length of time borrowers remain in the direct FLPs and the proportion of borrowers who exit or "graduate" from the programs, and (3) measure and identify ways of reducing loan subsidy rates. The first objective required examining characteristics and creditworthiness of recent borrowers to determine if they are consistent with the creditworthiness of groups targeted by the direct FLP mission. The second objective measured duration of loans and how many borrowers exited FLPs and graduated to commercial sources of credit. The third objective emphasized reducing FSA's loan restructuring and default costs.

This independent study was undertaken by a team of researchers in the Department of Agricultural Economics and Agribusiness at the University of Arkansas, Division of Agriculture, Fayetteville. The award for the project contract (CSREES Award number 2004-39528-14476) was finalized on June 14, 2004, with the goal of having a final report by June 2005. A preliminary report on the first objective was delivered to FSA's FLP staff on July 29, 2004. Where feasible, FSA worked conscientiously with the research team by providing data and explanations as requested. FSA also provided reviews of the preliminary report and an early draft of this final report. While the team appreciated and incorporated many of the reviewers' suggestions, this report is independent and is the sole responsibility of the research team. Responsibility for errors in analysis or interpretation of findings lies solely with the research team.

The analysis within the report draws primarily on four distinct data sources for two time periods. Data on individual loans from FSA loan making and servicing databases were obtained for fiscal years (FY) 1994–1996 and FY 2000–2003. The other three sources are USDA's Agricultural Resource Management Survey (ARMS) for 2000–2003, the 2002 Census of Agriculture, and a survey designed by the research team and administered by FSA staff of a sample of direct loans originated in FY 1994–1996.

Objective 1: Identify Groups Being Served by FSA Farm Loan Programs

• Direct FLPs are primarily serving family-sized farms. An estimated 78–92 percent of FLP Direct Loan recipients in FY 2000–2003 were farms with annual gross sales less than $250,000, a common definition for a small farm. The caps on the total amount of indebtedness a borrower can incur in the programs plus loan eligibility criteria appear to ensure that the clienteles of these programs are consistent with FSA's mission. Most borrowers had weak financial characteristics and would likely have had difficulty obtaining loans elsewhere.

• There is substantial geographical dispersion in the intensity of FLP loan use by loan type (FO, OL and EM). Loan size (principal) also differs among regions. The regional dispersion of FO and OL loans appears driven, in part, by the distribution of farmers eligible for FSA Direct Loans. In this report, EM loans are not evenly distributed geographically because demand for these loans was driven primarily by the location and intensity of natural disasters during the study period.

• Approximately 37 percent of all U.S. farms are estimated as the target market for FSA Direct Loans when farm size, credit needs, years of farming experience, and farming as an occupation rather than a hobby are taken into account. This is due largely to the large number of "hobby farms" that are not the target of FLPs.

• Market penetration, measured as the proportion of the target market for FSA Direct Loans that actually received FSA Direct Loans for FY 2000–2003, varies considerably across states, with the national average rate for all direct loans being 3.7 percent. Rates for any of the major FSA cohorts are below six percent. The majority of the states have rates less than 8.0 percent, ranging from 0.4 percent to 21.5 percent. These penetration levels may seem low but penetration as defined in this study refers only to borrowers originating new loans during FY 2000–2003. Based on estimates from ARMS data, market penetration increases by approximately a factor of five if all existing FSA FLP borrowers are included. Increased market penetration would require more obligation allocation or smaller loan amounts.

• FSA borrowers are in a weaker financial position (less creditworthy) than their non-FSA (farms with no FSA debt) counterparts as indicated by lower farm solvency, liquidity, repayment capacity, and financial efficiency. However, no significant differences in gross cash farm incomes, net cash farm incomes, and net farm incomes between FSA borrowers and non-FSA operators were found. The data suggest that direct loans on average are supporting farmers who would likely fail to meet conventional lending standards and hence would have trouble securing credit from private-sector sources at reasonable rates and terms.

• Direct FLPs provide less than 4 percent of the total farm debt in the U.S. But since FLPs are targeted to family farms, an estimated 18 percent of indebted non-hobby farmers and beginning farmers were found to rely on direct FLP loans for at least a portion of their credit needs. Given that these recipients were found to typically have weakness in their financial profiles and likely would have difficulty qualifying for commercial credit, the direct FLPs are largely servicing the intended clientele based on the agency's mission.

• Socially Disadvantaged (SDA) farmers tend to be geographically concentrated in southwestern and southeastern states. FSA market penetration rates into the SDA market are generally highest in states where SDA borrowers are clustered. In these regions a higher percentage of loans go to SDA borrowers than in the northern regions. Average national market penetration of SDA loans is 4.6 percent compared with a penetration ratio of 3.7 percent in the family farm market. Hence, penetration is greater for SDA operators than the overall family market.

• In general, race-based SDA borrowers appear to be financially comparable to non-SDA farmers, except for SDA race borrowers being more solvent. FSA targeting has, most probably, enabled more SDA borrowers to obtain FSA credit than they otherwise would. Targeting beginning farmers likely restricts allocations available to non-beginning farmer borrowers.

• SDA gender (female) farms exhibit statistically significant differences in financial characteristics from both the non-SDA and SDA race farms. SDA gender farms are significantly smaller and exhibit significantly less income but higher solvency than non-SDA farms. Differences in liquidity, repayment capacity, and financial efficiency between the two groups are not statistically significant. FSA Direct Loan market penetration for female farms is 2.6 percent.

• Beginning farmers operate significantly smaller farms (in terms of acres operated and gross cash farm income). As expected from their small sizes, they have significantly lower total incomes, assets, liabilities, and net worth levels. With their limited financial resources, size, and experience, beginning farmer borrowers are unlikely candidates for conventional credit.

• FSA is required to target 35 percent of OL allocations and 70 percent of FO allocations to beginning farmers. Thirty-eight percent of the OL loan dollar volume went to beginning farmer borrowers and 69 percent of FO loan dollar volume went to beginning farmer recipients over FY 2000–2003.

Objective 2: Length of Time Borrowers Remain in Program and Type of Exit

• An estimated 78 percent of direct FLP loans that originated from FY 1994–1996 were terminated (paid back or otherwise settled) by November 30, 2004. More than half

of the borrowers who originated loans during FY 1994–1996 no longer had any active OL, FO, or EM loans by November 30, 2004. The analysis did not identify if there is a cohort of *long-term* FLP participants.

• Loan termination was much more frequent for OL and EM loans than for FO loans. Duration times to termination were close to the term lengths for OL loans paid in full, and were between five and six years for EM loans although a larger proportion of these loans remain to be terminated.

• An estimated 53.4 percent of the terminated FY 1994–1996 loans had borrowers who exited FLPs and continued farming. Twenty-four percent of the terminated loans had borrowers who exited the FLPs and left farming voluntarily other than for retirement, and 6.9 percent of the loans had borrowers who retired. The remaining loans were terminated due to leaving farming involuntarily (11 percent) or due to death (5 percent). Among the 53.4 percent who continued farming, only 17 percent of these loans had farmers who graduated to FSA guaranteed credit and the remainder graduated by continuing farming and using conventional credit (65 percent) or no credit at all (18 percent).

• Consistent with other findings about FO loans, FO borrowers were least likely to exit. Also, borrowers who had larger numbers of other active FSA Direct Loans and higher debt-to-asset ratios at time of loan origination were less likely to exit FLPs. Borrowers with more direct loans may have a greater need for FLPs.

• The evidence on change in financial well-being is mixed but generally positive. Annual changes in net worth were positive and significant. Rising farmland values over this period undoubtedly contributed to this. Debt-to-asset ratios increased over time, which could indicate that the relatively young borrowers are in an expansion phase and acquiring new debt to support their operations. Current ratios did not change significantly over time for the sampled borrowers. These findings on financial characteristics coupled with the majority of borrowers leaving FLPs to continue farming or leave voluntarily indicate financial progress.

• For the most part, it appears FSA borrowers are using direct loans as a temporary credit source. A majority of the loans were paid back without a loss. A majority of borrowers did not become permanent clients of FSA.

Objective 3: Measuring and Reducing Subsidy Rates

• The amounts and percentages of direct FLP loan losses have generally trended downward over the FY 1994–2004 period. FO loans had a lower average annual loss percentage (2.0 percent) than OL (5.3 percent) and EM (13.2 percent) loans. FO loans are secured with real estate while OL and EM loans may be secured with either real estate or non-real estate assets, but primarily non-real estate assets. In general, during the study period, farmland values rose steadily, thereby greatly decreasing the likelihood of FSA sustaining material losses on farm ownership loans.

• An estimated statistical model shows the likelihood of a loan loss is positively related to borrowers with previous debt settlement experience with FLPs, indicating that loan restructuring activities are generally more likely to result in a loan loss. Farms found to be at greater risk of having their loans end in a loss—and hence increasing program costs—include those with higher relative indebtedness, less repayment capacity, less liquidity, crop farms, and larger farms. The likelihood of a loan loss is negatively related to borrowers already having or receiving an FO loan. The likelihood of a loan loss is not found to be significantly related to borrowers receiving limited resource rates (subsidized interest) or to those classified as socially disadvantaged.

• An estimated regression model indicates that, when a loan loss occurs, the amount of loan loss as a percent of the original loan amount is positively related to beginning farmer loans and negatively related to borrowers receiving FO and OL loans and having greater repayment capacity. The beginning farmer loan relationship indicates loan losses relative to loan amounts are greater for beginning farmer loans than non-beginning farmer loans.

• The loan loss analysis suggests the following options to reduce loan loss occurrence: reject applicants who have had previous debt settlement experience (i.e., adhere strictly to the existing one-time debt forgiveness policy);

grant loans to borrowers who already have FO loans; require increased collateral and stronger financial standards, and continue to concentrate on lending to small farms. However, in addition to reducing loan losses, these options would greatly reduce the number of farmers receiving FSA loans.

• A consistent policy requiring farmers to purchase insurance in order to receive farm program payments and qualify for emergency assistance should limit the demand for emergency loans and thus the rate of loan losses. Crop insurance and additional collateral beyond the crop itself would likely mitigate loan loss rates.

• There are several options to decrease loan loss rates such as: increase the proportion of FO and OL loans relative to EM loans; decrease the number of beginning farmer loans (i.e. the group of farmers most likely to be denied credit from conventional creditors due to limited experience, lack of track record, and inadequate equity); and restrict loans to farms with less than a specified repayment capacity (many existing FSA recipients with low repayment capacity would instead be denied credit). In general, such activities would run counter to the role of FLPs—i.e. making credit available to farm operators on the financial margin.

Limitations

A primary study goal was to measure the market for FSA Direct Loans. While the majority of U.S. farms were designated ineligible, we believe far too many farms were left in the eligible pool. Yet, to be consistent with precedent in the literature, the eligibility criteria were minimal. Hence, estimated penetration ratios seem low.

The study did not focus on identifying and estimating a subset of long-term ("life-time") FLP borrowers. Such research would require much different data than those collected in this study. To the extent that there are such borrowers, a detailed analysis would need to be conducted to determine the attributes of such borrowers and how the life-time cycle could be ended.

FSA would further like to lessen losses and the need to do loan restructurings. The data collected do not explain the occurrence of such events as well as better data probably could. Personal events such as medical emergency, change in marital status, and loss of off-farm employment are probably important factors explaining the occurrence of these losses. Collection of such data would go far beyond what FSA does in its loan application and Farm and Home Plans. Perhaps a longitudinal panel of sample borrowers would help FSA to better understand the dynamics of its borrowers.

The estimates of loan terminations and loan losses are biased downwards. More loans were terminated than reported here, but our assumptions bias this estimate downward. An ability to track loans through their various restructurings and consolidations would have made the termination estimates more exact. Loan losses for the FY 1994–1996 loans will increase as some currently active loans encounter financial difficulties in the future.

The Farm and Home Plan data used have some quirks. In particular we strongly believe that zeroes were entered where an observation was potentially missing. We assumed the zeroes in such instances were, in fact, missing data. Also, although we treated the Farm and Home Plan data as completely representative of the FY 2000–2003 borrowers, only 43 percent of the loan originators were paired with a Farm and Home Plan.

The data in the survey of FY 1994–1996 loans had to be "cleaned." Observations that appeared as data entry errors or implausible guesses were changed to missing observations. Questions in the survey answered as "unknown" were also set to missing. Such practices are common in the use of primary data. The inferences from the data are conditional upon these actions.

Estimates based on ARMS data identifying FSA borrowers are likely biased downwards. In ARMS farm operators only report five of their loans. If they have six or more loans, these extra loans are not reported. A farm operator with six or more loans could have omitted all FSA loans and therefore be counted as a non-FSA Direct Loan participant even though they had an FSA Direct Loan.

CONTENTS

List of Figures

List of Tables

Farm Service Agency Direct Farm Loan Program Effectiveness Study

John Nwoha, Bruce L. Ahrendsen, Bruce L. Dixon,
Eddie C. Chavez, Sandra J. Hamm, Daniel M. Settlage, and Diana Danforth

Final Report

Introduction

As is customary with government programs, there is a need for periodic assessment to determine whether stated goals are met and if changes would be useful to improve program effectiveness. The Office of Management and Budget's (OMB)[1] 2005 Passback for Farm Service Agency (FSA) requested an independent performance-focused review of the FSA Farm Loan Programs (FLPs) to guide management initiatives for the Direct Farm Loan Program and Fiscal Year (FY) 2006 budget requests. The goal of this study is to provide data and analysis to assist policymakers in determining how effectively FSA's Direct Farm Loan Programs are meeting their stated objectives.

The specific objectives of this study are: (1) to examine how effectively the Direct Farm Loan Program is serving family farms in general as well as specifically targeted groups; (2) to evaluate the length of time borrowers remain in the program, to identify the outcomes for borrowers receiving loans in the past, and to identify changes in financial characteristics; and (3) to describe the extent of subsidy use by various cohorts and to determine what steps can be taken to lower these subsidy costs. The results of this study will aid policymakers in determining ways to improve overall program performance, provide FSA officials with information needed to sharpen self-review, and help characterize the role of FSA Farm Loan Programs in the agricultural credit market.

Effectiveness is evaluated in the context of three objectives. In Objective 1, we examine the history of the FSA, the current trends in agricultural lending, the demographics and location of FSA loan recipients, the targeting of socially disadvantaged and beginning farmers of FSA loans, the financial characteristics of FSA borrowers, and the implications of alternative creditworthiness standards.[2] In Objective 2, we investigate loan and borrower duration in the FSA Direct Loan Programs and the financial progress of FSA loan recipients over time. In Objective 3, we measure subsidy rates and discuss ways of reducing subsidy rates.

1. Groups Being Served by FSA Direct Farm Loan Programs

1.1. FSA Mission and History, and Data Sources for Study

The Direct Farm Loan Programs administered by the Farm Service Agency (FSA) are designed to provide credit to family-sized farms[3] "unable to obtain credit from conventional sources at reasonable rates and terms" despite having sufficient cash flow to repay and an ability to provide security for the loan (Dodson and Koenig, 2000, p.1). FSA is an agency of the United States Department of Agriculture

[1] Definitions of abbreviations used in this study are presented in appendix table 1.A.
[2] Definitions of targeted groups are provided in appendix table 1.B.
[3] Family-sized farms are defined explicitly in section 1.2.2.

(USDA). FSA's Direct Farm Loan Program provides short- to intermediate-term farm operating loans (OL) and long-term farm ownership (FO) loans as well as emergency (EM) loans. In addition to serving the general category of family-sized farms, federal legislation compels FSA's FO and OL lending programs to target specific subgroups falling under the family-farm umbrella. These groups are socially disadvantaged applicants (SDA) and beginning farmer (BF) applicants.

The FSA defines a socially disadvantaged farmer or rancher as "one of a group whose members have been subjected to racial, ethnic, or gender prejudice because of their identity as members of the group without regard to their individual qualities. For purposes of FSA programs, socially disadvantaged groups are women, African Americans, American Indians, Alaskan Natives, Hispanics, and Asian Americans and Pacific Islanders (USDA/FSA, 2004 a). The definition of a BF varies by loan type. For OL purposes, a BF is a farmer who meets the general eligibility criteria for an OL loan and has ten or less years of farming experience. For FO purposes, a BF is a farmer who meets the general criteria for an FO loan, has three to ten years of farming experience, and owns acreage that does not exceed 30 percent of the county average farm size.[4] If the applicant is an entity, all members must be related by blood or marriage, and all stockholders in a corporation must be eligible beginning farmers (USDA/FSA, 2004 b).

1.1.1. Farm Service Agency Mission

The mission of the Farm Service Agency is: "To help ensure the well-being of American agriculture and the American public through efficient and equitable administration of farm commodity, farm loan, conservation, environmental, emergency assistance, and domestic and international food assistance programs" (USDA/FSA, 2005). One of the key, stated goals of FSA is to: "Assist eligible individuals and families in becoming successful farmers and ranchers" through the use of the Farm Loan Program (FLP) (USDA/FSA, 2005, p.6). Strategies stated by FSA to achieve this goal are: "1) implement an aggressive supervised credit program, 2) identify and correct borrower performance problems promptly, 3) actively market and sell inventoried properties, 4) aggressively monitor and address processing problems, 5) correct staffing deficiencies and streamline work processes, and 6) continue outreach efforts." (USDA/FSA, 2005, pp. 7–8).

1.1.2. History of Federal Farm Credit Assistance

Government assistance in providing credit to farmers and ranchers in need began in the early 1900s and evolved into its present form. Several major agencies provided assistance in the twentieth century. These were the Resettlement Administration (1935–1937), Farm Security Administration (1937–1946), and Farmers Home Administration (1946–1994). Currently, the Farm Service Agency (1994–present) is responsible for administering the federal direct and guaranteed loan programs to farmers.

1.1.2.1. The Early Years

From 1918 through 1931, Congress provided Emergency Crop and Feed Loans to farmers who had suffered losses due to floods and droughts in designated areas and were unable to obtain credit elsewhere (U.S. National Archives and Records Administration, 1995). In 1932, the Reconstruction Finance Corporation (RFC) organized twelve regional offices called the Regional Agricultural Credit Corporations (RACC). These offices offered operating loans to farmers and ranchers unable to obtain commercial credit. The Farm Credit Act of 1933[5] established one Production Credit Association (PCA) in each of the twelve Federal Land Bank districts, and these PCAs assumed the functions of the RACC.

[4] Prior to 2004, the acreage limit was 25 percent of the county average farm size (U.S. 7 CFR 1943.4).

[5] United States Statutes At Large, 73rd Congress, 1933-1934 Vol. 48, Part 1, Public Laws, Ch. 98, 48 Stat. 257,12 U.S. Code § 1131 et seq.

The Federal Emergency Relief Act of 1933[6] resulted in the formation of the Rural Rehabilitation Division in April 1934. Its responsibility was the formation of government loan programs in which the borrower would agree to operate the farm under new farming plans developed with the help of the Division's county representative (USDA/FmHA, 1991). In 1935, Executive Order 7027 created the Resettlement Administration, which existed for two years. Short-term loans were made to low-income farm families based on a Farm and Home Plan that had been worked out by the borrowing family and the county representatives (USDA/FmHA, 1991). In 1937, the Farm Security Administration took over the responsibilities of the Rural Rehabilitation Division with a focus on supervised lending to farmers who could not obtain credit elsewhere.

1.1.2.2. Farmers Home Administration

Under the Farmers Home Administration Act of 1946 (P.L. 60-731), the Farm Security Administration and Emergency Crop and Feed loan programs were consolidated and administered by one new agency called the Farmers Home Administration. Farmers Home Administration was known as FHA until 1974 when the abbreviation was changed to FmHA.[7] In addition to maintaining a system of county offices, FmHA provided many different services to farmers over the years.

Responsibility for federal programs supporting rural growth was transferred to the USDA via the Rural Development Act of 1972 (P.L. 92-419). With this Act, FmHA continued to expand in the area of rural development and was authorized to guarantee loans made by commercial banks for farming, housing, and rural business development in cities with populations up to 50,000. Youth loans for income-producing enterprises managed through school organizations were also authorized in this Act.

The Agricultural Credit Act of 1978 (P.L. 95-334) expanded the eligibility of farm loans to family corporations, cooperatives, and partnerships (USDA/FmHA, 1991). The principal limits for FO loans were increased to $200,000 for direct loans and $300,000 for guaranteed loans. OL limits were increased to $100,000 and $200,000 for direct and guaranteed loans, respectively. Special interest rates on direct FO and OL loans (set below the cost of government borrowing) were made available to farmers with limited resources (Dodson and Koenig, 1997).

FmHA's EM and OL programs changed with the Agricultural Programs Adjustment Act of 1984 (P.L. 98-258). The limits for new direct OL loans increased from $100,000 to $200,000 and from $200,000 to $400,000 for new guaranteed OL loans. For direct EM or OL loans that were rescheduled or consolidated, maximum repayment time "increased from seven to fifteen years from the date of the original note" (USDA/ERS, 1991). If a farmer's county bordered a designated disaster county (for disasters occurring after May 30, 1983), then the farmer became eligible for emergency loans. Twenty percent of direct OL and FO funds was allotted for limited resource borrowers.

Under the Food Security Act of 1985 (P.L. 99-198), the FmHA was mandated to emphasize guaranteed lending instead of direct lending. FmHA could guarantee up to 90 percent of the principal of the loan made by a qualifying lender (USDA/ERS, 1988). The Agricultural Credit Act of 1987 (P.L. 100-233) changed the way FmHA serviced farm loans. Delinquent loans could be written down if the borrower had a plan to continue farming and government recovery from the restructured loan would be greater than or equal to the amount recovered through foreclosure. The SDA group outreach program was established to assure that socially disadvantaged applicants had opportunities to buy or lease

[6] United States Statutes At Large, 73rd Congress, 1933-1934 Vol. 48, Part 1, Public Laws, Ch. 30, 48 Stat. 55.

[7] This change was made to easily distinguish Farmers Home Administration from other agencies that have the same initials (USDA/FmHA 1991, p. 6).

inventory farm property (USDA/ERS, 1991). As a consequence of the increased emphasis on guaranteed loans, direct loan obligations dropped below $1 billion in 1990 while guaranteed obligations increased to $1.3 billion (USDA/ERS, 1991).

Legislation from the Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624) established a placement program for those borrowers who were eligible to graduate from direct loans to guaranteed loans and placed tighter restrictions on debt restructuring. The Agricultural Credit Improvement Act of 1992 (P.L. 102-554) authorized FmHA to focus on beginning farmers and ranchers and graduating direct loan borrowers to the guaranteed lending program. To better serve BF applicants, a down payment loan program was established for the direct and guaranteed FO loan programs (USDA/ERS, 1993). To improve graduation rates, lifetime limits for FSA borrowers to receive assistance were established for OL loans. Borrowers became ineligible for insured OL assistance after receiving OL loans for 10 years, and ineligible for guaranteed assistance after 15 years (USDA/ERS, 1993).

1.1.2.3. Farm Service Agency

FmHA ceased to exist with the signing of the Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994 (P.L. 103-354). Under this reorganization of USDA agencies, FmHA's farm credit programs were transferred to the newly formed Consolidated Farm Service Agency (USDA/ERS, 1995). The Consolidated Farm Service Agency was subsequently renamed the Farm Service Agency (FSA) in 1995 (Stam, Wallace, and Koenig, 1997). The policy push to have borrowers graduate from direct to guaranteed loans continued with the Federal Agriculture Improvement and Reform Act of 1996 (1996 Farm Act, P.L. 104-127). This Act narrowed the eligibility criteria for applicants. For direct FO loans, the applicant either had to have less than 10 years of FSA borrowing experience or be qualified as a beginning farmer. Direct OL loan applicants had to have five years or less of farm operating experience or six years or less of direct OL borrowing experience. Direct FO loans could no longer be used to refinance existing indebtedness. For the EM loan program, the maximum total borrower indebtedness was capped at $500,000. Previously the cap only applied to a particular disaster, allowing total EM indebtedness for a borrower to exceed $500,000 (Stam, Wallace, and Koenig, 1997).

The Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999 (P.L.105-277) raised the caps on borrower indebtedness for the guaranteed Farm Loan Programs. The caps are now adjusted annually as inflation rises. The cap increase is computed by the "Prices Paid by Farmers Index" and is calculated by the National Agricultural Statistics Service (USDA/NASS, 1999). If the index for the immediate fiscal year exceeds the index for the previous fiscal year, the caps are raised. The 1999 guaranteed FO and OL loan program limits were raised to $700,000, although the caps for the direct FO, OL, and EM Farm Loan Programs remained at $200,000, $200,000, and $500,000, respectively. Previously the guaranteed FO and OL loans were capped at $300,000 and $400,000. The maximum total indebtedness allowed for a borrower with guaranteed loans from one or both programs was set at $700,000 (USDA/ERS, 1999). The current maximum total program indebtedness for guaranteed loans as adjusted for inflation is $813,000 (USDA/FSA, 2004 a).

The Farm Security and Rural Investment Act of 2002 (2002 Farm Act, P.L. 107-171) enacted changes in FSA Direct Farm Loan Programs to make borrowing easier. The eligibility time limits for direct OL loans were waived to provide longer access to FSA-funded farm programs (USDA/FSA, 2004 b). Applicants became eligible for FO loans after participating in the operation of a farm for three years, instead of having to have operated a farm for three years. If borrowers had received debt forgiveness as a result of a major emergency or natural disaster declaration in the past,

they could now become eligible for new direct or guaranteed loans. The acreage ownership restrictions for beginning farmer and rancher FO loans changed from no more than 25 percent to no more than 30 percent of the county average farm size. More funding was made available for the beginning farmer guaranteed loan program and down payment loans increased from 10 to 15 years and from 30 to 40 percent of sale price (USDA/ERS, 2003).

1.1.3. Data Sources

In the sections that follow, we review several aspects of the Direct Farm Loan Program based on activity from fiscal years (FY) 2000–2003. The data examined in this study were obtained from various sources. FSA provided us data from their loan-making database, which we refer to as the New Loan Database (NL database) in the remainder of this report. FSA also provided data from its loan-servicing database and a database of Farm and Home Plans (FHP) used in certain sections of this report. Data were also obtained from various issues of FSA Farm Loan Programs Monthly Management Summaries (MMS) published by the USDA/FSA. Additional data were obtained from the 2002 Census of Agriculture conducted by the National Agricultural Statistics Services (NASS), and from the Agricultural Resources Management Survey (ARMS) jointly conducted by NASS and the Economic Research Service (ERS). In addition to these secondary data sources, data concerning FSA Direct Loan origination activities for FY 1994–1996 were obtained through a national survey of FSA county offices conducted primarily for this study.

FSA's internal Farm Loan Program Making and Loan Servicing database for FY 2000 – 2003 (New Loan database) provides detailed information about every loan. The database contains information about the borrower (tax identification or social security number, county and state of residence, race, ethnicity, and gender), and the loan (number, type, assistance type, amount, interest rate, origination date, and maturity date). The database also contains any flags associated with servicing the loan. The database contains a total of 70,923 loans made to 54,984 borrowers during FY 2000–2003, which represents recent loans. This report focuses on these recent loans even though it would have been possible to consider loans made in earlier years. Our mission was to analyze the effectiveness of the current program and going back before 2000 would not be reflective of recent and current activity. Out of the 70,923 loans in the database, 9,747 were youth loans made to 9,062 youth borrowers. Since the focus of this report is not on youth programs, the youth loans were excluded from the GIS maps and other analysis presented in this report. An additional 1,025 loans were removed from the database based on their assistance-type classification. The NL database used in this report has 60,151 loans and 45,016 borrowers.

In the process of applying for a direct loan, applicants must fill out a Farm and Home Plan (FHP). This plan contains a balance sheet, income statement, and demographic information about the applicant. As part of this study, FSA furnished 117,391 FHPs for some of the 45,016 borrowers who originated loans in FY 2000–2003. It was possible to match 19,153 or 42.5 percent of the borrowers with the most recent FHP they completed prior to obtaining an FSA loan. Financial information extracted from the FHPs of 19,153 borrowers is presented in this report as a gauge of FSA borrowers' financial characteristics by loan type, assistance type, and demographic groupings.

FSA publishes a summary of the Agency's loan-making activities in a yearly internal document titled "USDA Farm Service Agency: FSA Farm Loan Programs Monthly Management Summary." This document, published every September by the National Office of Farm Loan Programs, contains data on FSA loan-making activity for the current year and also for previous years. This publication, called the Monthly Management Summary (MMS), provid-

ed most of the data used in discussing current FSA agricultural lending trends.

The ARMS is conducted annually by the USDA, which collects detailed information on farming practices and farm financial conditions including credit sources. This survey samples only a small proportion of the overall U.S. farm population. For the analysis in this study using ARMS data from 2000–2003, the average annual sample size was 11,917. However, the sample database includes a set of complex replicate weights (expansion factors) that are designed to expand the sample so that estimates of the overall farm population can be obtained. Thus, by using ARMS data, it is possible to obtain state level expanded (estimated) counts of farms with various characteristics (e.g. race, gender, sales class, etc.).

The 2002 Census of Agriculture by NASS provides counts on the number of farms in a county as well as a number of characteristics about each farm and the farm operators. In particular, these data are used to identify the number of farms in a given county that would be considered eligible for an FSA Direct Loan. The farms are counted by gender, race, and beginning farmer status. These counts then provide the denominator for ratios that measure proportion of FSA-eligible farmers who have obtained at least one FSA Direct Loan in FY 2000–2003. While some census data are available in the public domain, a special tabulation was required to obtain information on the numbers of FSA-eligible farmers cross-classified by gender, race (ethnicity), and beginning farmer status. This tabulation was conducted at the NASS data laboratory in Washington D.C. by members of the study team.

In the preliminary report submitted on July 29, 2004, ARMS data for the three-year period 2000–2002 were used to estimate the number of farmers *eligible* for FSA direct assistance as well as the average balance sheets and income statements for various farmer groups. Part of this study is concerned with how extensively FSA has penetrated the potential market for FSA Direct Loans. Because of deficiencies in both the Census and ARMS databases, two sets of estimated counts of the number of eligible borrowers are produced in this study. One set comes from the four-year ARMS data (2000–2003) and the second set is from the 2002 Census of Agriculture. Both sets are presented in the discussions that follow, as called for by the various types of analyses.

Additional data for objectives 2 and 3 for this study were obtained through a national survey of FSA county offices. The instrument was designed by the research team at the University of Arkansas and administered electronically through the FSA secure intranet. The survey instrument contained 71 borrower and loan information questions. Two thousand, seven hundred and fifteen (2,715) usable responses were collected during the period of November 22, 2004 through December 17, 2004. The final data download was received by the University of Arkansas Division of Agriculture on December 21, 2004. A detailed discussion of the survey instrument and the survey procedure is presented in section 2 of this study.

1.1.4. Current Agricultural Lending Trends

The current trend in the agricultural credit market is a continued shift away from FSA direct credit toward FSA guarantees and toward other sources of credit. Figure 1.1 displays the share of total farm business debt by originating lenders between 1960 and 2003. As shown in the figure, the share of FSA direct-lending total farm business debt remained steady from the 1960s to the late 1970s. FSA's direct lending share began increasing in the late 1970s and peaked in 1987 before a steady decline to the present. This decline is at least partially a result of the Food Security Act of 1985 (P.L. 99-198) mandate for FmHA (and later, FSA) to emphasize guaranteed loans over direct loans.

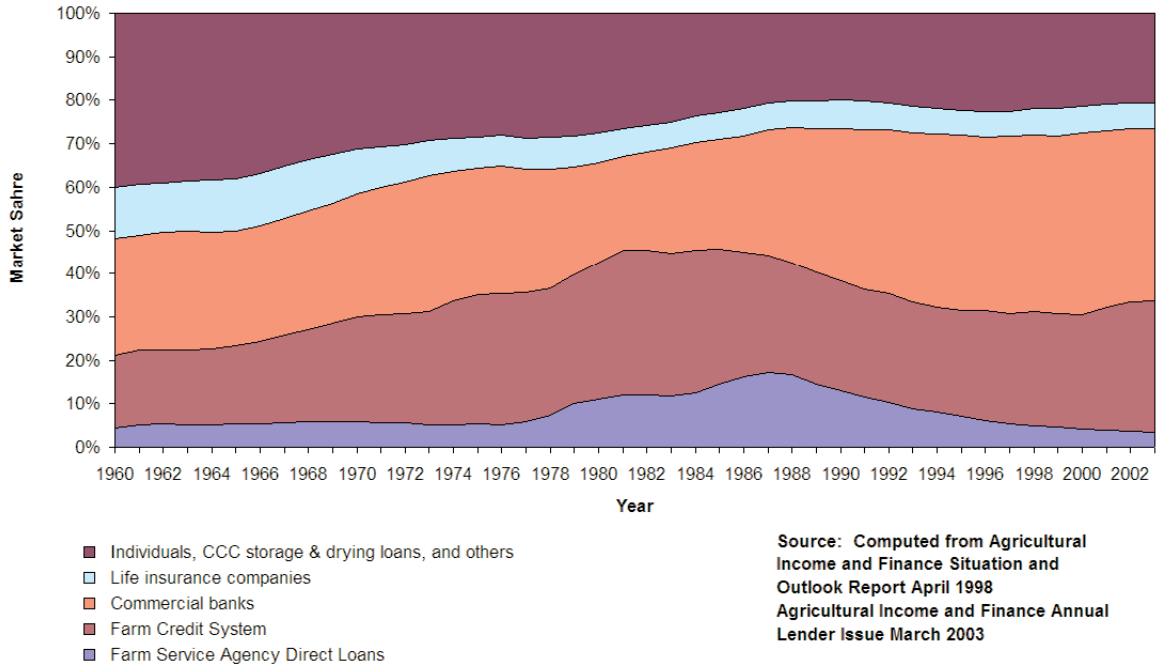


Figure 1.1. Share of total farm business debt by originating lender, 1960–2003

Figure 1.2 illustrates the volume of Direct Farm Loan Program principal outstanding as a proportion of total (direct plus guaranteed) FSA principal outstanding. Direct principal outstanding has declined from over 90 percent in 1984 to under 45 percent in 2002 of total FSA direct and guaranteed principal outstanding. Although guaranteed loans have surpassed direct loans in both principal outstanding and dollars obligated per year since 1999 in dollar terms, FSA still made more direct loans than guaranteed loans for each of the four fiscal years 2000–2003.[8] This is partially due to the Direct Farm Loan Program including youth loans, which have principal capped at $5000.

Figure 1.3 shows the average loan size for direct and guaranteed loans originated during FY 2000–2003 by region.[9] Guaranteed loans are far larger in principal than are direct loans. This is a result of the fact that more direct loans are made in any given year and more dollars in principal are obligated in the guaranteed program. Also, guaranteed loan caps are larger than direct loan caps. Moreover, the direct loans include youth loans. Even with the exclusion of youth loans, the average direct loan size is still smaller than that of the average guaranteed loan size.

1.2. Demographics, Location, and Volume of FSA Direct Loans, FY 2000–2003

In this section, we discuss the numbers and volumes of FSA Direct Loans made to various cohorts. In particular, we examine FSA Direct Loans to all borrowers, family farms, SDA borrowers, and BF borrowers.

1.2.1. FSA Direct Loans to All Borrowers

Loan counts obtained from the New Loan database show that the agency made 60,151 direct loans to 45,016 borrowers from 2000 to 2003. A breakdown of the number of borrowers, loans, and counties covered is presented in table 1.1. OL loans accounted for

[8] FSA Monthly Management Summaries, September 30 for years 2000-2004.

[9] The ten regions are defined using the previous ERS region designations. The regions are: Northeast (CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT), Lake States (MI, MN, WI), Corn Belt (IL, IN, IA, MO, OH), Northern Plains (KS, NE, ND, SD), Appalachian (KY, NC, TN, VA, WV), Southeast (AL, FL, GA, SC), Delta States (AR, LA, MS), Southern Plains (OK, TX), Mountain (AZ, CO, ID, MT, NV, NM, UT, WY), and Pacific (CA, OR, WA).

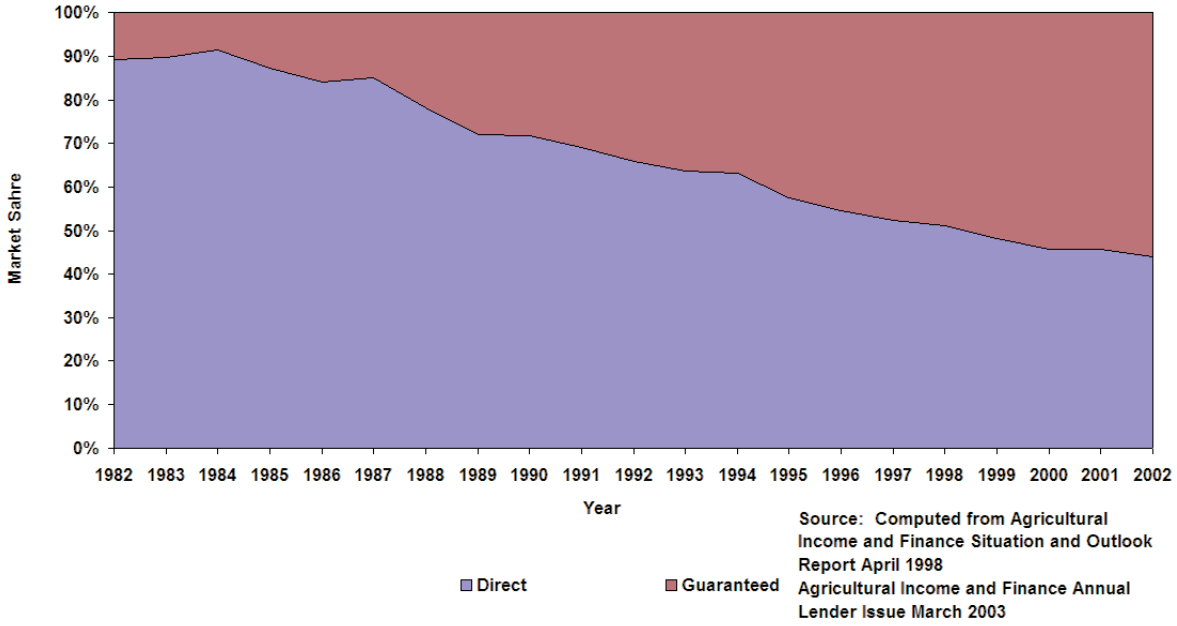


Figure 1.2. Share of total FSA farm business debt: direct vs. guaranteed loans, 1982–2002

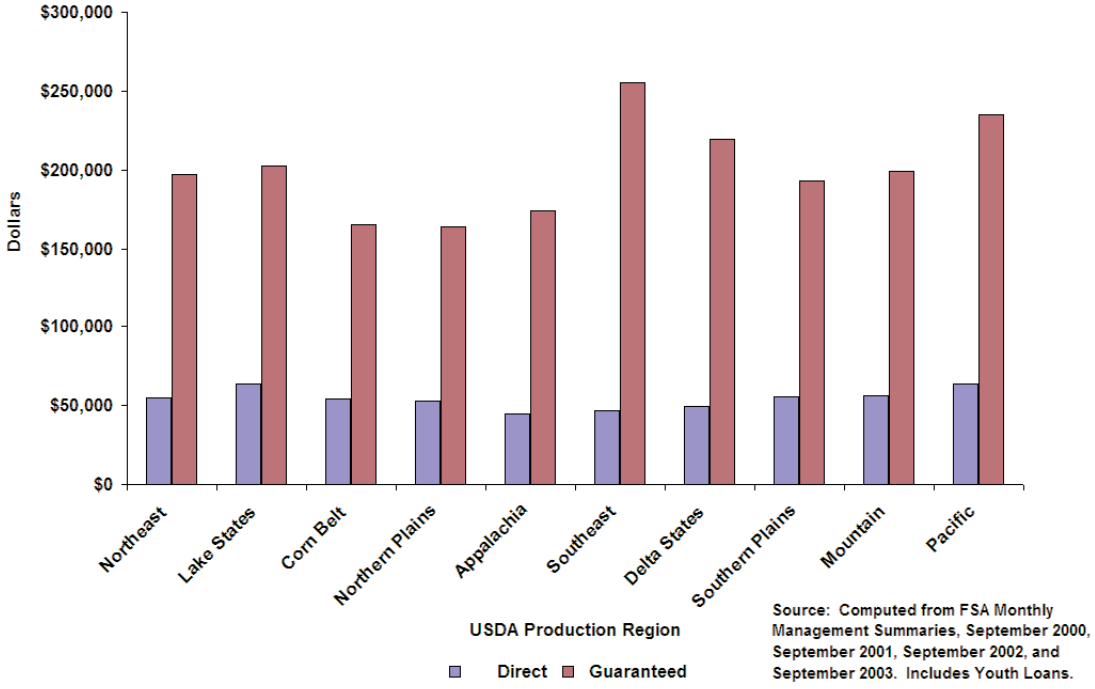


Figure 1.3. Average direct loan size vs. average guaranteed loan size, FY 2000–2003 four-year average

Table 1.1. New FSA Direct loans by type of loan, FY 2000–2003

Loan type	Loan count	Borrower count	County count
All types	60,151	45,016*	2,592
Operating Loans (OL)	47,540	37,729**	2,486
Farm Ownership Loans (FO)	6,127	6,067	1,604
Emergency Loans (EM)	6,484	6,018	1,158

Source: Computed from FSA New Loan Database
*Loan recipients are counted as new borrowers for each of the years they appear in the new loan database. While there are 28,852 unique borrowers within the four-year period, borrowers are counted as new borrowers for each year they obtain a new loan. Therefore, a unique borrower can appear as frequently as four times in the count of new borrowers.
** A borrower who obtains multiple loans within a year is counted once for each type of loan within the year. Therefore, the number of borrowers from each type of loan exceeds the sum for all types of loan. A borrower who obtains loans in different years is counted once for each of the years.

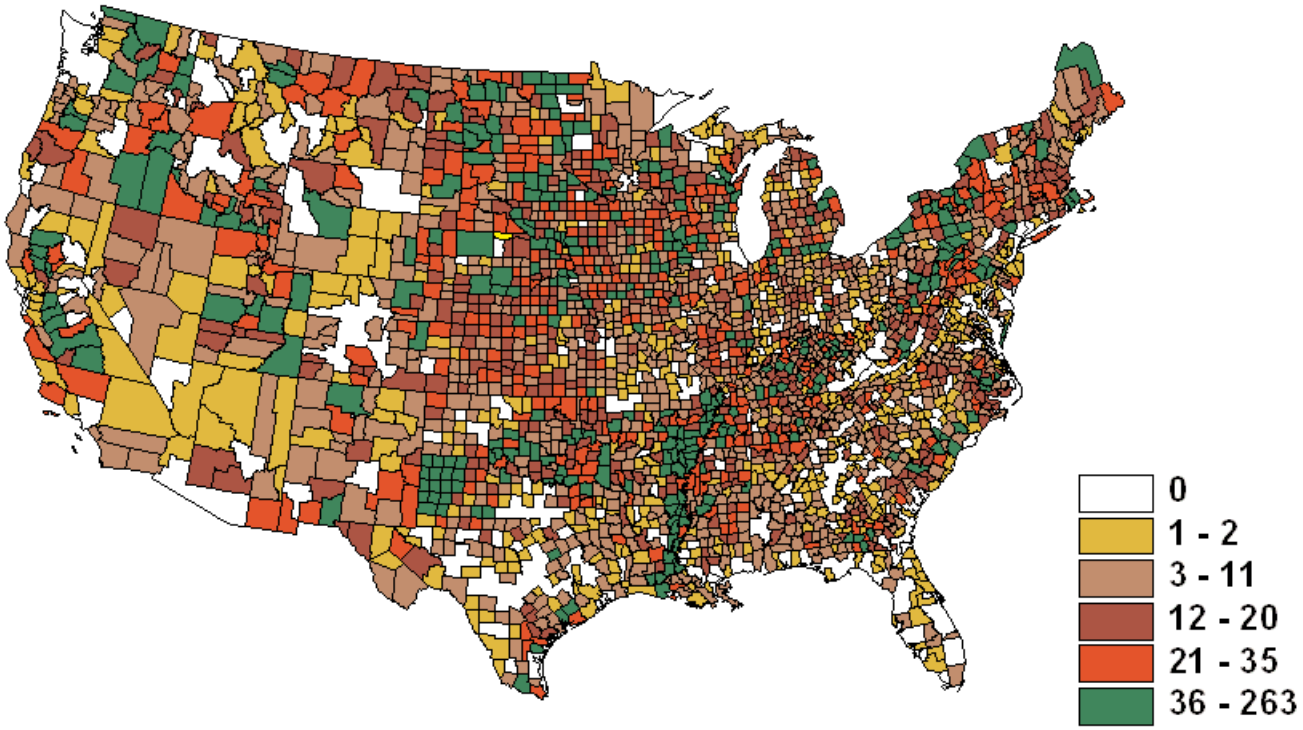


Figure 1.4. FSA Direct OL, FO, and EM borrowers, FY 2000–2003

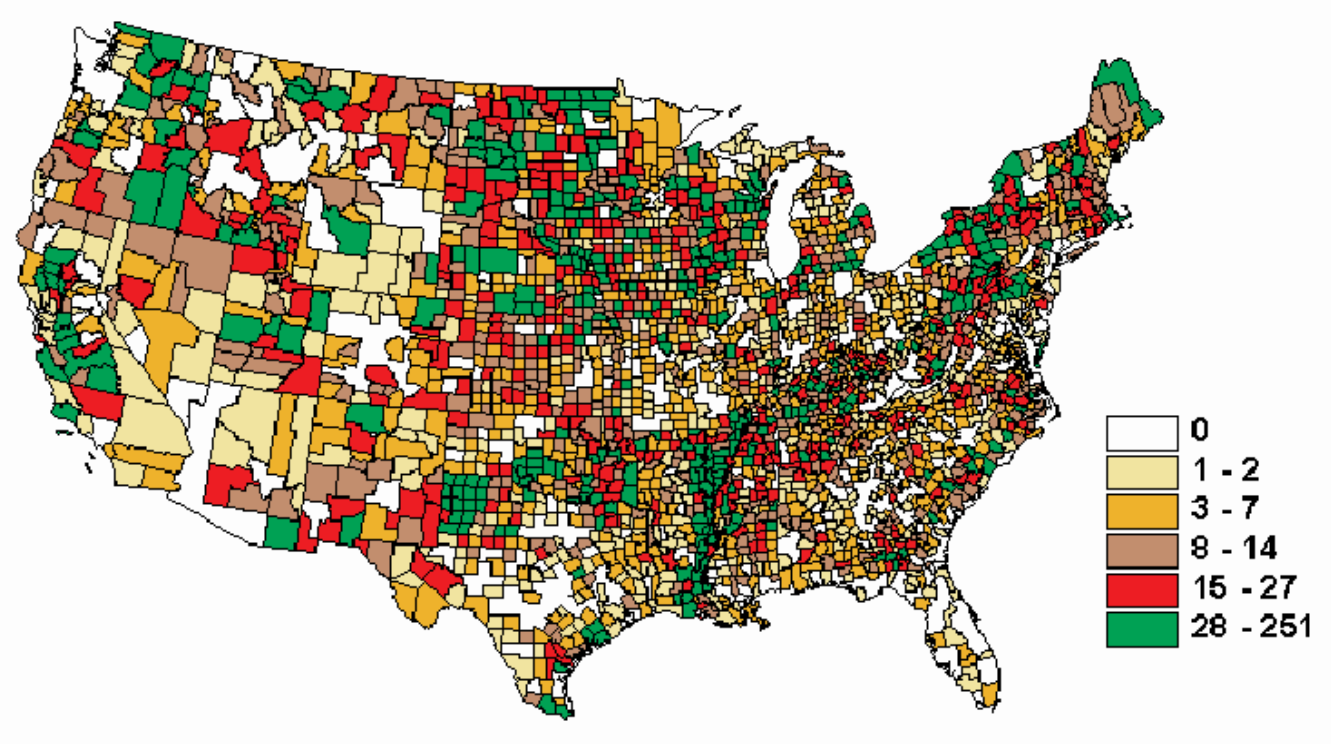


Figure 1.5. FSA Direct OL borrowers, FY 2000–2003

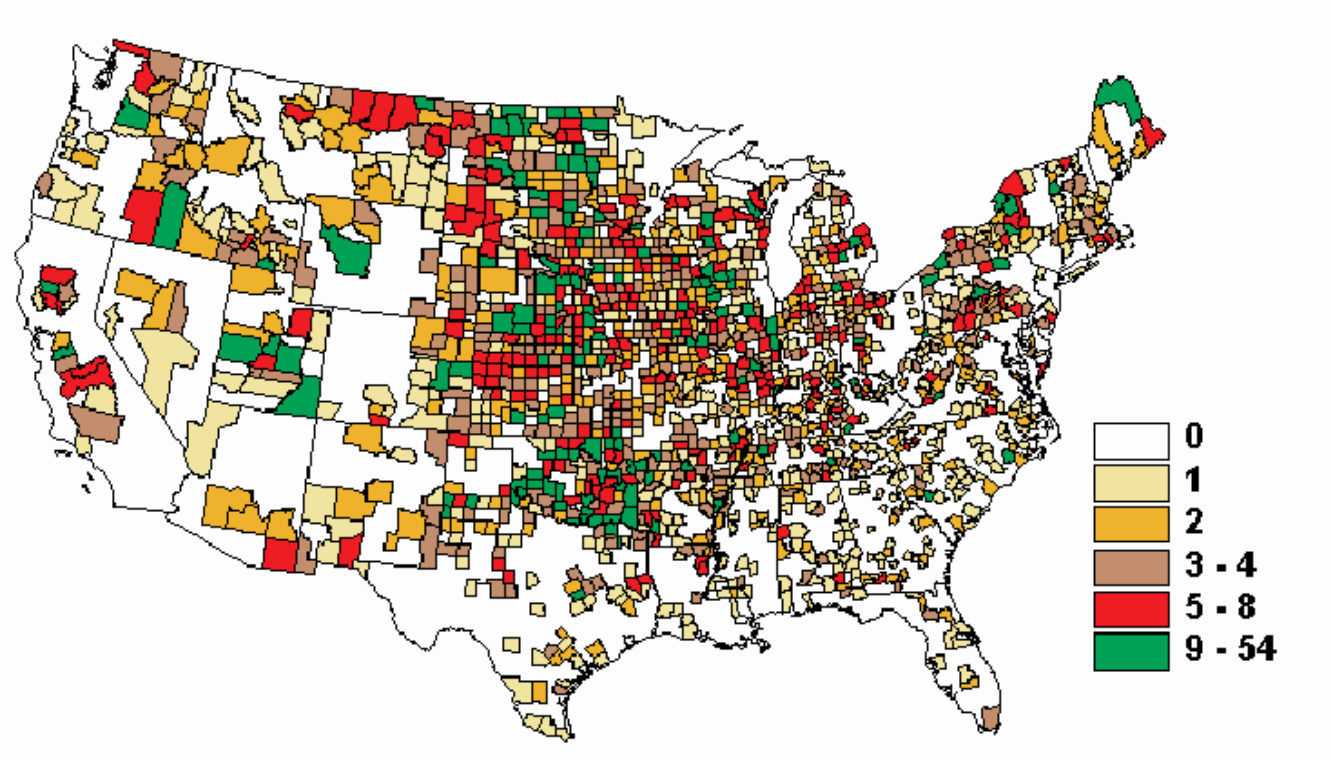


Figure 1.6. FSA Direct FO borrowers, FY 2000–2003

79.03 percent of the loans in table 1.1 while FO and EM loans accounted for 10.19 percent and 10.78 percent, respectively.

The numbers and types of loans made to farmers differ across counties. Figure 1.4 presents the number of borrowers for all the three types of loans, OL, FO, and EM combined. The figure shows a substantial geographical dispersion in the intensity of FSA loan use. For example, out of the 3,078 counties reported in the 2002 Census of Agriculture, 484 (15.7 percent) had no borrowers while counties such as Franklin Parish in Louisiana, Lancaster County in Pennsylvania, and Aroostook County in Maine had 242, 259, and 263 borrowers, respectively.

Figure 1.5 presents a count of borrowers of OL loans. Given that OL loans account for about 79 percent of all loans, it is not surprising to see the similarity between figure 1.5 (OL loan borrowers) and figure 1.4 (all loan borrowers combined).

Figure 1.6 shows the number of FO loan borrowers across the U.S. Unlike OL borrowers, FO borrowers are much fewer in number and located in fewer counties. Yet the intensity of use of FSA loans exhibits substantial geographical dispersion with number of borrowers ranging from 0 to 54 within counties. Surprisingly, three of the four counties with the highest number of FO loan borrowers are located in Oklahoma while the counties in the Southeast farm production region (Alabama, Florida, Georgia, and South Carolina) have very few FO loan borrowers.

Figure 1.7 presents the number of EM borrowers for FY 2000–2003. The figure shows a wide geographical

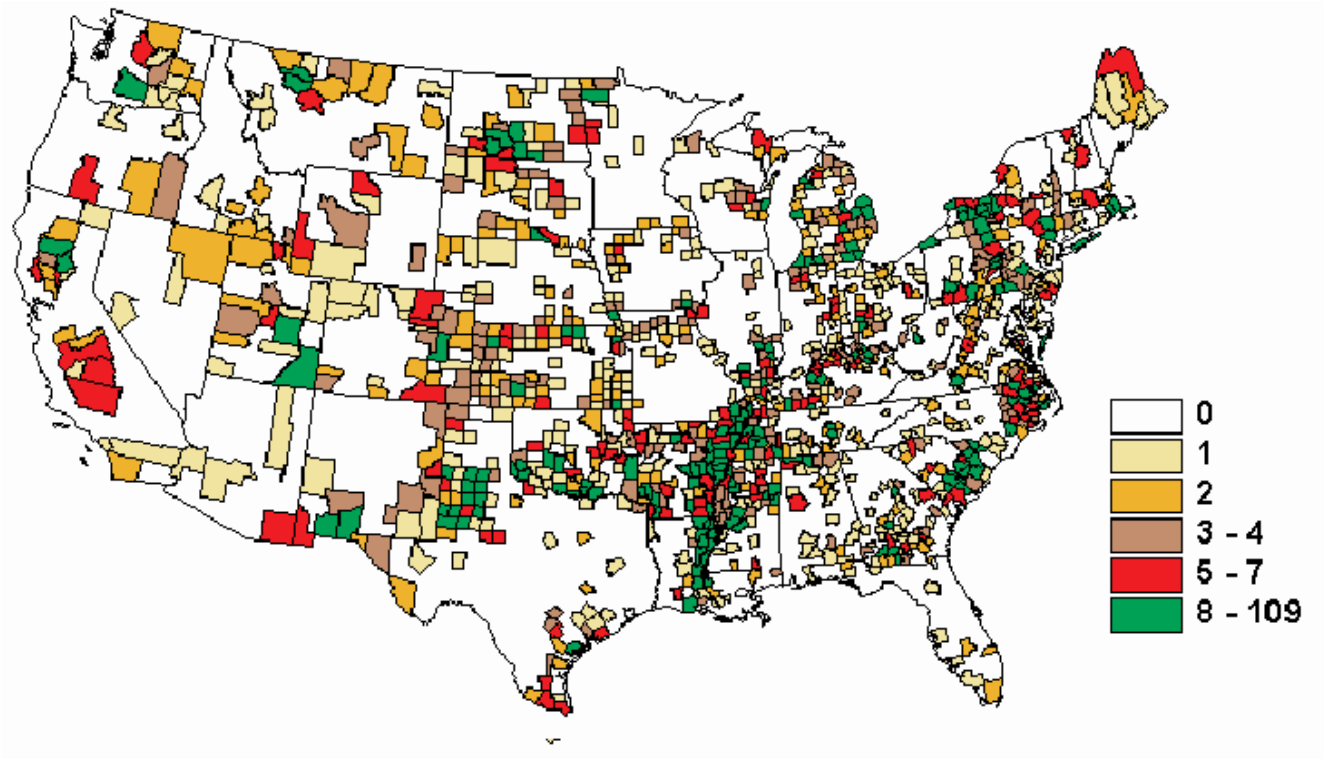


Figure 1.7. FSA Direct EM borrowers, FY 2000–2003

dispersion of borrowers across the U.S. However, unlike OL and FO loans, EM loans occur because of disasters. For example, Terry County in Texas had a total of 164 borrowers for all loans combined, but had 109 EM borrowers—the largest number of EM borrowers of any county in the four-year period. Terry County and the adjoining counties in the Southern High Plains were plagued with drought between 2000 and 2003. Hale, Swisher and Briscoe counties, all in Texas, were affected by the drought.[10] The coastal plains of the Appalachians and the Northeast also show high numbers of EM borrowers, probably due to coastal storms. Inland, the delta states of Arkansas, Louisiana, and Mississippi show a large proportion of EM loan borrowers.

In summary, figures 1.4 – 1.7 show that the intensity of use of FSA loans has substantial geographical dispersion, and that the intensity varies by type of loan. Dodson and Koenig (2003) observed geographical variations in FSA lending activity for FSA loans made from 1995 to 1999. We continue to observe this trend for FSA loans made between FY 2000 and 2003. For OL and FO loans, the geographical dispersion is driven partly by the dispersion of eligible borrowers while the dispersion in EM loan use is driven by natural disasters.

1.2.2. FSA Direct Loans to Family Farm Borrowers

The intended clientele for FSA's Direct Loan Programs are creditworthy family farming operations that are unable to obtain credit from conventional sources. The definition of a family-sized farm used by FSA is a farm that: "(a) is similar to other farm operations in

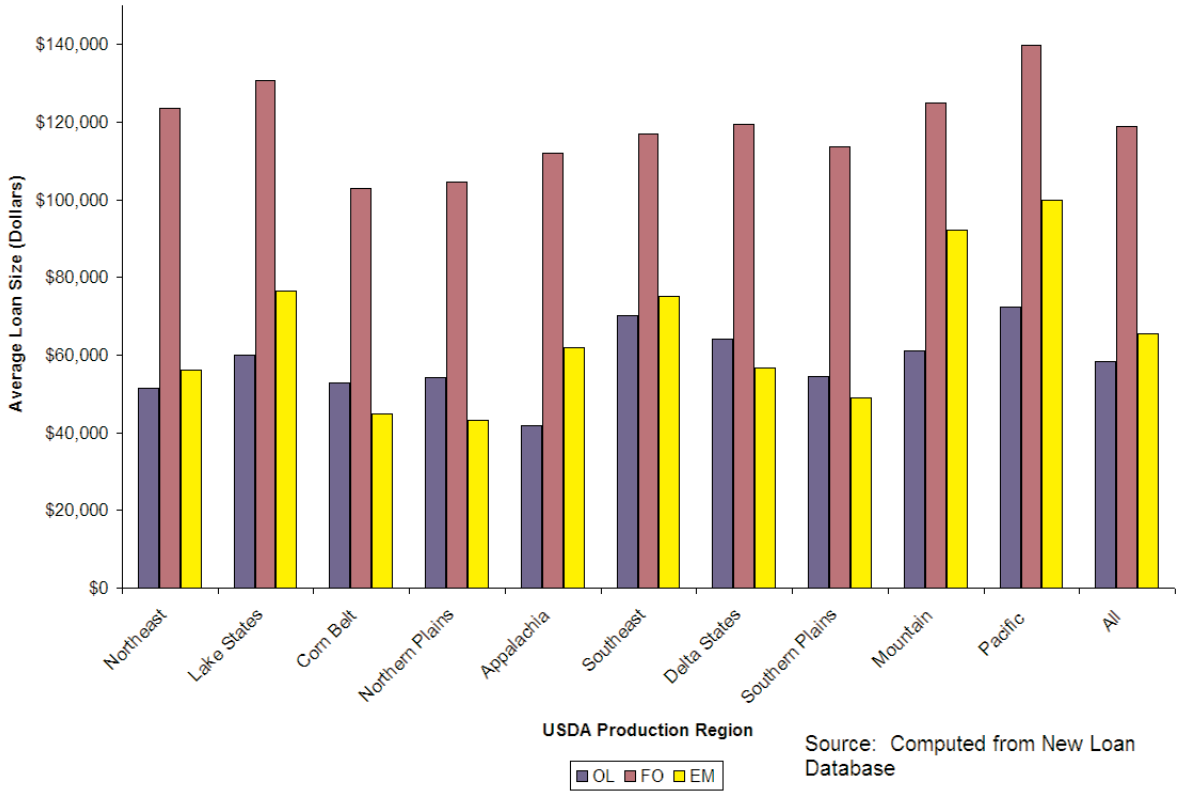


Figure 1.8. FSA loan size by loan type and USDA production region, FY 2000–2003

[10] Yates, J. Personal E-mail Communication, Extension Specialist, Risk Management, South Plains District 2, Route 3, Box 213AA, Lubbock, TX 79403. E-mail response to John Nwoha, Program Associate, University of Arkansas, Division of Agriculture. April 28, 2005.

the community, (b) has an operator of the farm who provides all day-to-day management and operational decisions of the farm business, (c) has an operator who contributes a substantial amount of full-time labor to the farming operation, and (d) has credit needs that are consistent with a family sized farming operation" (Dodson and Koenig, 2003 p. 193).

Although a family farm is not precisely defined, total borrower indebtedness caps may help to ensure that family farms are the primary recipients of FSA Direct Loans. The indebtedness caps for the FO and OL programs are $200,000 each, while the cap is $500,000 for the EM program.[11] As evident in figure 1.8, the origination amounts for the majority of direct loans are well under the program caps. As expected, average origination amounts are substantially larger for FO loans than for both OL and EM loans. EM loans average slightly larger amounts than OL loans. Nationwide, from FY 2000 to FY 2003, the average direct OL loan was $55,822, the average direct FO loan was $113,739, and the average EM loan was $60,177. Over the same time period, there were annual averages of 11,855 OL loans, 1,532 FO loans, and 1,621 EM loans made. Regional average principal amounts ranged between $102,875 and $139,905 for FO loans, between $41,736 and $72,262 for OL loans, and between $43,106 and $99,836 for EM loans. The regional data show evidence of mild heterogeneity in loan size. On average, the Pacific and Lake States regions have the largest FO loans, while the Corn Belt and Northern Plains have the smallest FO loans. For OL loans, the Pacific and the Southeast regions average the largest loan sizes. The Appalachian region has the smallest average OL loan size.

1.2.3. FSA Direct Loans to Small Family Farm Borrowers

According to the USDA farm typology definition, a 'small' family farm is a farm with sales less than $250,000 per year. This definition follows from a suggestion by the National Commission on Small Farms (USDA/ERS, 2004). Given the lending caps of FSA's Direct Farm Loan Program, small family farms are more likely the primary beneficiaries of the direct loan program.

To estimate the proportion of direct loans made to small farms, it is necessary to use ARMS data. This is required because the New Loan database did not report sales levels for FSA Direct Loan borrowers. ARMS data for the four-year period from 2000 to 2003 were used to estimate the number of family farms in the U.S. and the number of those farms originating direct loans in 2000–2003. The ARMS data estimate an average of 2,104,280 farms per year.[12] Of these farms, only 45,226 (2.15 percent) are estimated to have been FSA Direct Loan originators and the remaining 2,059,054 are non-FSA Direct Loan originators.[13]

One indication of the extent of FSA loan activities among small farms is the percentage of FSA loans made to small farms. This percent is calculated as the four-year expanded total number of farms in ARMS surveys with sales less than $250,000 and reporting one or more of FSA-sourced loans originated during the calendar year of the survey divided by the four-year expanded total of all farms (regardless of sales) reporting one or more of FSA-sourced loans originated during the calendar year of the survey. Nationwide, nearly 78 percent of FSA Direct Loans

[11] A borrower may have multiple loans of the same type (OL, FO, or EM) as long as the sum of the original principal on those loans is less than the indebtedness cap for the particular loan type.

[12] The four-year total before excluding an estimated 621 farms with more than one million dollars in a FSA direct loan is 8,417,740. The 621 farms are excluded because they are unlikely FSA farms since individual loan program caps are $500,000 or less. Thus the averages calculated here are based on a four-year total of 8,417,119 farms.

[13] We caution the reader here that there is a large distinction between FSA Direct Loan originators and farmers with at least one FSA Direct Loan. An operator originating no FSA Direct Loans during 2000-2003 but still having one or more active FSA Direct Loans originated prior to 2000 would not be counted. The reason for this distinction is to focus on more recent FSA loan originations.

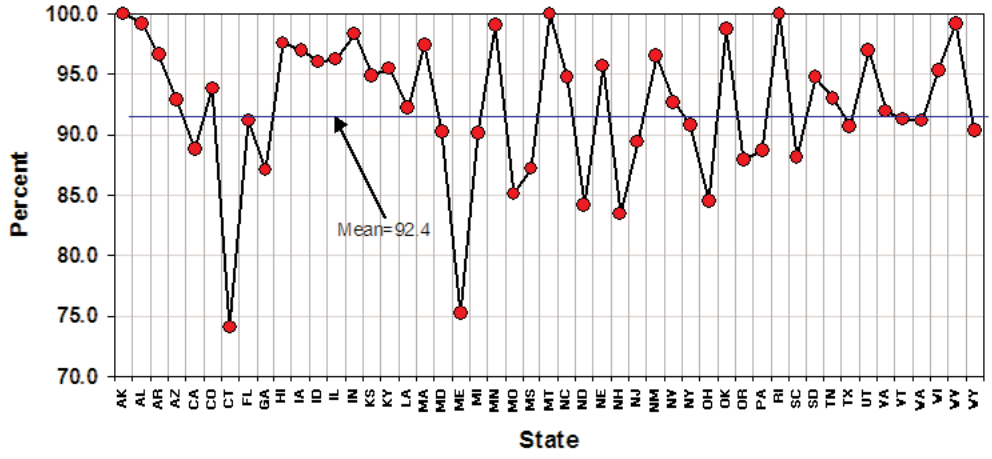
went to small family farms, with 65 percent of the states devoting at least half of new direct loans to small farmers.[14]

The ARMS data, however, do not give reasonable estimates of small farm counts by state, with nine states showing no FSA small farms at all. The FSA New Loan data set, on the other hand, cannot be used by itself because it does not have the sales variable to delineate the small farms. A better indication of the state-level loan servicing involvement of FSA in small farms is obtained by using the combined FSA New Loan and the Farm and Home Plan data sets. The Farm and Home Plan's gross income variable (crop income plus livestock income plus other farm income) was used as a proxy for sales, thus enabling small farms in the New Loan data set to be counted.

Results in figure 1.9 show that by state, the percent share of small farm borrowers to the total FSA borrowers who received new loans in FY 2000–2003 ranges from 74.1 percent (Connecticut) to 100 percent (Alaska, Montana, and Rhode Island). Overall, 92.4 percent (indicated by the horizontal line) of the FSA borrowers were small farms. This compares favorably with the 88.2 percent proportion of small farms to the total FSA-eligible farm population estimated from the 2002 Census of Agriculture as discussed later in section 1.3.

1.2.4. FSA Direct Loans to SDA Borrowers

Under the Agricultural Credit Act of 1987 (P.L. 100-233), FSA began officially targeting Socially Disadvantaged Applicants (SDAs) applying for direct FO loans. The Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624) and the Agricultural Credit Act of 1992 (P.L. 102-554) expanded SDA targeting to include OL loans and women. Currently, the law requires FSA to "reserve or target a portion of its direct and guaranteed operating and farm ownership loan funds for use exclusively by socially disadvantaged applicants. SDAs are classified in one or more of the following categories: women, African Americans, Native Americans, Alaskan Natives, Hispanics, Asians, and Pacific Islanders. In the farm ownership loan program, the percentage of loan funds targeted for SDAs is based upon the state percentage of the total rural population made up of SDA



Source: Computed from Combined FSA New Loan Database and Farm and Home Plan Database

Figure 1.9. Percent share of small farms to total FSA borrowers, FY 2000–2003

[14] Of the remaining 22 percent of FSA direct loans, an estimated 13.7 percent went to farms with $250,000 to $499,999 of sales, 6 percent went to farms with $500,000 to $999,999 of sales, and only 2.4 percent went to farms with $1,000,000 or more in sales.

groups, and the statewide percentage of total farmers who are female. In the operating loan program, the target is determined by the statewide percentage of total farmers from the SDA minority group, and the statewide percentage of total farmers who are female" (USDA/FSA, 2004 a). EM loans are not specifically targeted to SDAs.

Table 1.2 provides a count of the number of loans and borrowers to different cohorts including SDAs and the number of counties represented by these borrowers. African Americans make up the largest racial group followed by American Indian or Alaskan Native and Hispanics. Asians and Pacific Islanders make up substantially smaller proportions. The combined racial group has more loans and borrowers than the SDA group comprised of females.

In this study, SDAs are counted based on assistance types and indicated race/ethnicity and sex from the FSA New Loan Database (FY 2000–2003). A borrower is counted as female or SDA gender if the indicated gender is female or if the indicated loan assistance type is SDA gender. Counting female loans by indicated gender alone resulted in 3,622 loans to women. Combining assistance type and indicated gender increased the number of loans to 3,669 or an additional 47 loans. Some of the 47 additional loans came from entries with missing gender and a few from males coded as receiving gender loans. Beginning farmers are counted as borrowers who received an FSA loan with beginning farmer assistance type. The race and ethnic category counts are based on the indicated race or ethnicity. If a borrower indicated more than one race, she/he is counted once in each of the races or ethnicity.

Table 1.2. Counts of FSA loans, borrowers, and counties by loan cohorts FY 2000–2003

Cohort	Number of loans	Number of borrowers	Number of counties
All FSA borrowers	60,151	45,016	2,592
OL borrowers	47,540	37,729	2,486
FO borrowers	6,127	6,067	1,604
EM borrowers	6,484	6,018	1,158
Female or SDA gender	3,669	2,642	992
Beginning farmer	23,984	17,733	2,092
American Indian or Alaskan Native	1,468	1,044	259
Asian	324	251	78
Black or African American	2,180	1,417	365
Hispanic or Latino	1,440	1,108	247
Native Hawaiian or Other Pacific Islanders	91	74	34

Source: Computed from FSA New Loan Database

Table 1.3. Grouping of loans based on assistance type, FY 2000–2003

Aggregate assistance type	Frequency	Percent	Cumulative frequency	Cumulative percent
OL regular	24,266	40.34	24,266	40.34
OL BF	16,762	27.87	41,028	68.21
OL BF SDA	3,042	5.06	44,070	73.27
OL SDA	3,470	5.77	47,540	79.03
FO regular	1,538	2.56	49,078	81.59
FO BF	3,491	5.80	52,569	87.40
FO BF SDA ethnic	356	0.59	52,925	87.99
FO BF SDA gender	297	0.49	53,222	88.48
FO SDA ethnic	267	0.44	53,489	88.92
FO SDA gender	178	0.30	53,667	89.22
EM	6,484	10.78	60,151	100.00

Source: Computed from FSA New Loan Database

Table 1.4. Counts of loans by loan type for different loan cohorts FY 2000–2003

Cohort	OL regular	OL BF	OL BF SDA	OL SDA	FO regular	FO BF	FO BF SDA ethnic	FO BF SDA gender	FO SDA ethnic	FO SDA gender	EM	Total
Female or SDA gender	281	250	1,257	1,057	12	35	28	297	22	178	252	3,669
	(7.66)	(6.81)	(34.26)	(28.81)	(0.33)	(0.95)	(0.76)	(8.09)	(0.60)	(4.85)	(6.87)	(100)
Female	281	250	1,257	1,057	12	35	28	272	22	156	252	3,622
	(7.76)	(6.90)	(34.70)	(29.18)	(0.33)	(0.97)	(0.77)	(7.51)	(0.61)	(4.31)	(6.96)	(100)
Beginning Farmer	0	16,762	3,042	0	0	3,491	356	297	0	0	0	23,948
	(0.00)	(69.99)	(12.70)	(0.00)	(0.00)	(14.58)	(1.49)	(1.24)	(0.00)	(0.00)	(0.00)	(100)
Amer. Indian or Alaskan Native	101	56	411	542	9	13	127	26	81	10	92	1,468
	(6.88)	(3.81)	(28.00)	(36.92)	(0.61)	(0.89)	(8.65)	(1.77)	(5.52)	(0.68)	(6.27)	(100)
Asian	10	4	68	160	1	0	25	4	16	4	32	324
	(3.09)	(1.23)	(20.99)	(49.38)	(0.31)	(0.00)	(7.72)	(1.23)	(4.94)	(1.23)	(9.88)	(100)
Black or African American	25	23	803	917	1	0	49	3	72	6	281	2,180
	(1.15)	(1.06)	(36.83)	(42.06)	(0.05)	(0.00)	(2.25)	(0.14)	(3.30)	(0.28)	(12.89)	(100)
Hispanic	73	32	460	519	2	12	83	9	46	4	200	1,440
	(5.07)	(2.22)	(31.94)	(36.04)	(0.14)	(0.83)	(5.76)	(0.63)	(3.19)	(0.28)	(13.89)	(100)
Native Hawaiian/Other Pac. Isl.	12	3	26	34	0	4	4	1	1	0	6	91
	(13.19)	(3.30)	(28.57)	(37.36)	(0.00)	(4.40)	(4.40)	(1.10)	(1.10)	(0.00)	(6.59)	(100)
All	24,266	16,762	3,042	3,470	1,538	3,491	356	297	267	178	6,484	60,151
	(40.34)	(27.87)	(5.06)	(5.77)	(2.56)	(5.80)	(0.59)	(0.49)	(0.44)	(0.30)	(10.78)	(100)

Source: Computed from FSA New Loan Database
Note: The numbers in the shaded rows are percent share by loan type for each cohort so that the row percentages sum to 100 percent.

Table 1.3 presents a count of loans based strictly on assistance types. For OL loans, SDA is comprised of OL BF SDA and OL SDA assistance types. For FO loans, SDA includes FO BF SDA ethnic, FO BF SDA gender, FO SDA ethnic, and FO SDA gender. Clearly the most frequent loans were regular OL loans with 40 percent of all the direct loans made. The next most frequent loan type was OL BF with 28 percent of direct loans originated. FO loans comprise about 9 percent of loans made.

Table 1.4 presents the counts of loans by loan type to selected SDAs. The numbers in the top row are the counts of loans while the numbers in brackets represent the top number as a percentage of all loans to the cohort. A total of 7,610 SDA loans were made to 4,040 unique borrowers from 2000 to 2003. The majority of the SDA loans to eligible borrowers (85.57 percent) were made under the OL SDA and OL BF SDA categories.[15] Women and the different ethnic and racial groups receive the majority of their loans from the SDA loan assistance types. For example, OL BF SDA and OL SDA loans account for about 64 percent of all FSA loans to women. The different races and ethnic groups obtained the majority of their loans from the OL BF SDA and OL SDA assistance types. However, some SDA eligible borrowers receive non-SDA loans. For example, nearly 16 percent of loans to females had a non-SDA assistance type. An SDA eligible borrower may receive a non-SDA loan due to availability of funds for various loan assistance types.

Figure 1.10 displays the average loan size (as measured by principal outstanding at origination) by OL and FO loans to SDA and non-SDA borrowers. Aver-

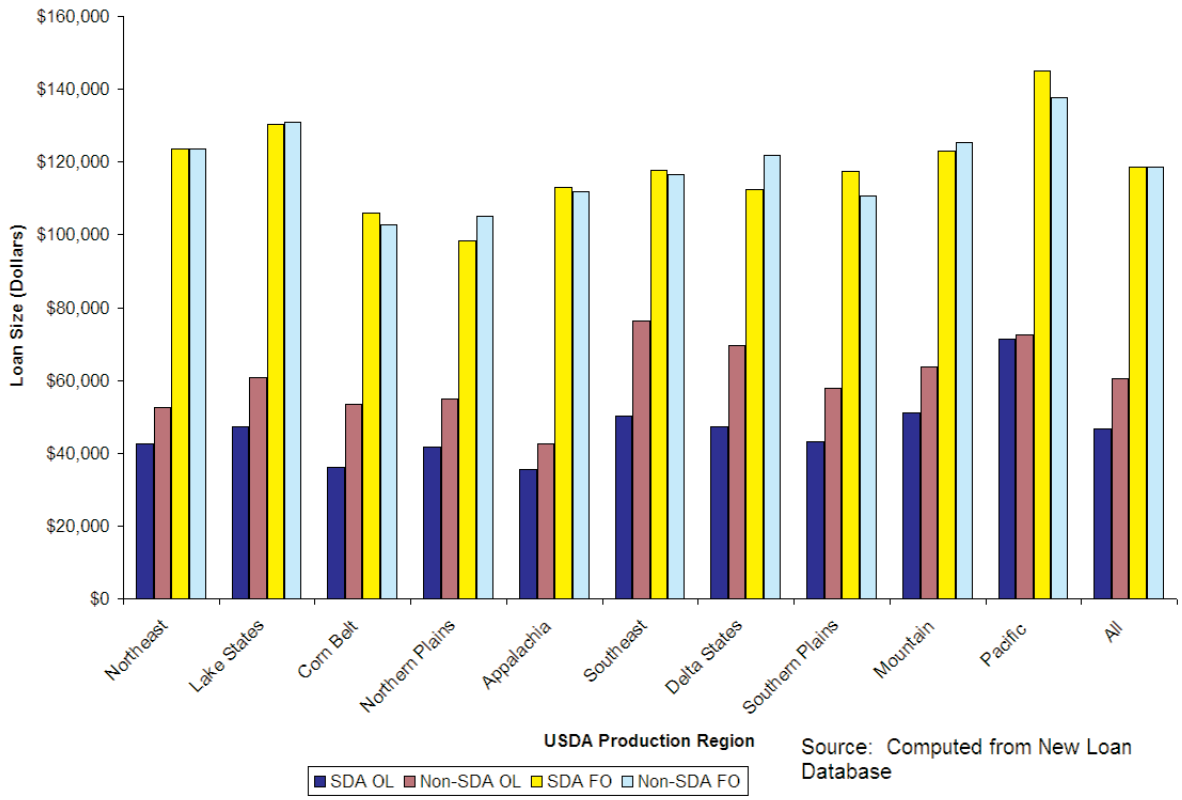
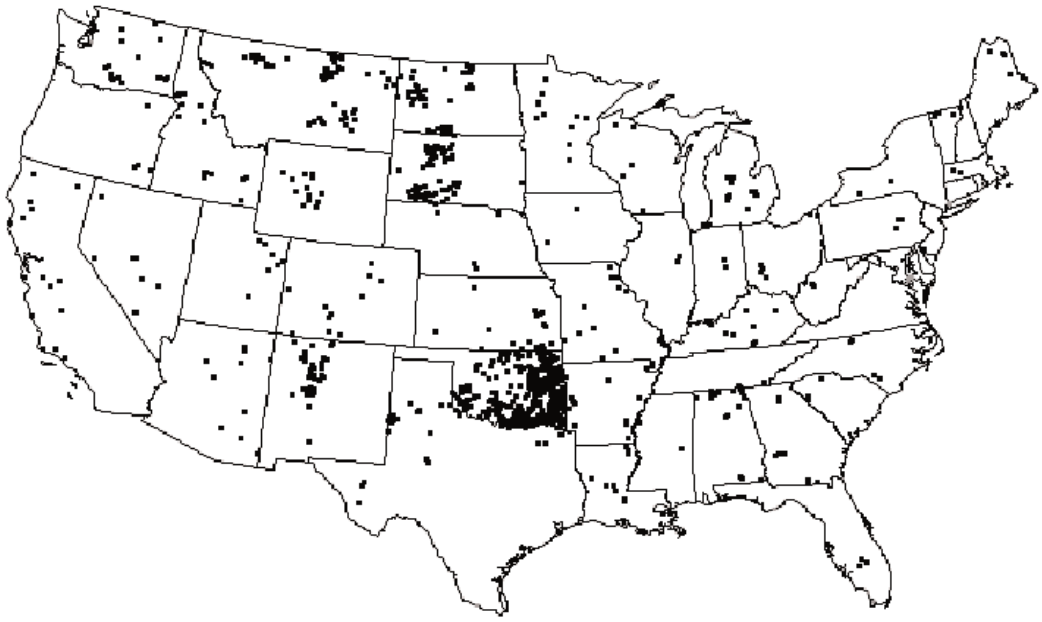


Figure 1.10. Average FSA loan size by loan type and USDA production region for SDA and Non-SDA borrowers, FY 2000–2003 four year average

[15] A borrower is SDA eligible if they are female or a non-white race or both.

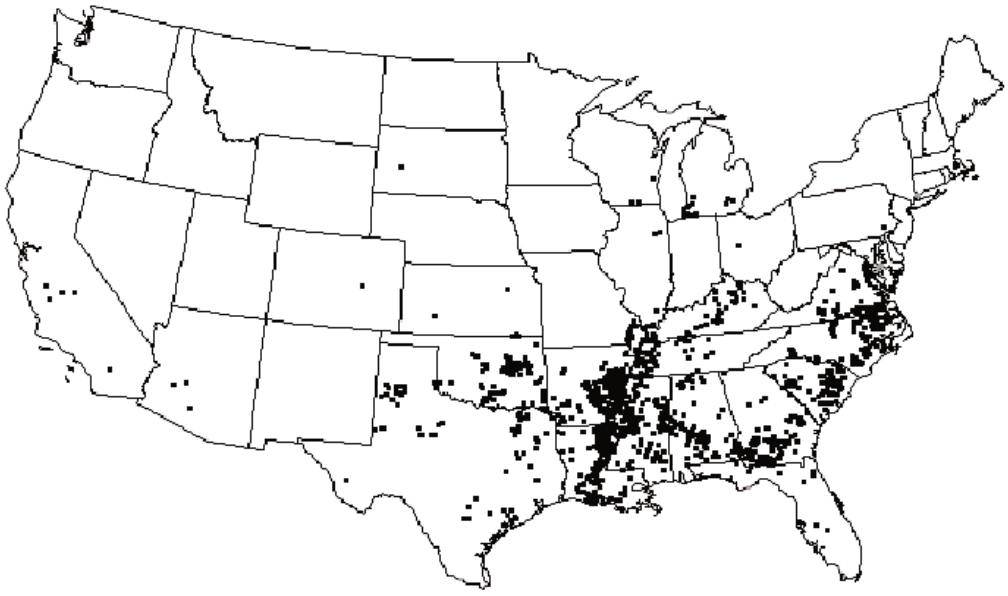
age SDA OL loan size is substantially smaller than non-SDA OL loan size in every region. On a national level, the average non-SDA OL loan is $57,271 and the average SDA OL is $46,692. In general, the average FO loan size for SDA borrowers is similar to that of non-SDA borrowers. In the Delta States, Northern Plains, and Mountain regions non-SDA FO loan size is slightly larger than that of SDA FO loan size, while the reverse is true in the Southern Plains and the Pacific regions. Nationally, the average non-SDA FO is $113,221 and the average SDA FO is $116,110. Reasons for these disparities are discussed when borrower financial characteristics are examined and compared among cohorts in section 1.4.

The six maps in figures 1.11–1.16 show the geographical dispersion of FSA SDA borrowers. Each dot on a map represents one SDA borrower who received at least one new direct loan during the FY 2000–2003 period. As the figures indicate, SDA borrowers tend to be geographically concentrated. American Indian/Alaskan Native borrowers are concentrated in Oklahoma, New Mexico, and North and South Dakota. African American/Black borrowers are concentrated along the Mississippi River delta and the Coastal Plains as well as in Oklahoma. Asian borrowers are clustered in California while Native Hawaiian/other Pacific Islanders are low in numbers relative to the other racial/ethnic groups and are spread uniformly across the country. Hispanic/Latino borrowers are concentrated in the Southwest, California, and Washington. There is also a concentration of Hispanic borrowers in Puerto Rico which is not shown on any of the figures. Women borrowers are geographically dispersed, with a general increase in density east of the Rockies and specific concentrations in and around Oklahoma, Arkansas, Tennessee, Kentucky, Massachusetts, and Rhode Island.



Source: Computed from FSA New Loan Database

Figure 1.11. Distribution of American Indian and Alaskan Native farmers receiving FSA Direct Loans, FY 2000–2003



Source: Computed from FSA New Loan Database

Figure 1.12. Distribution of African American or Black farmers receiving FSA Direct Loans, FY 2000–2003

Figure 1.13. Distribution of Asian farmers receiving FSA Direct Loans, FY 2000–2003

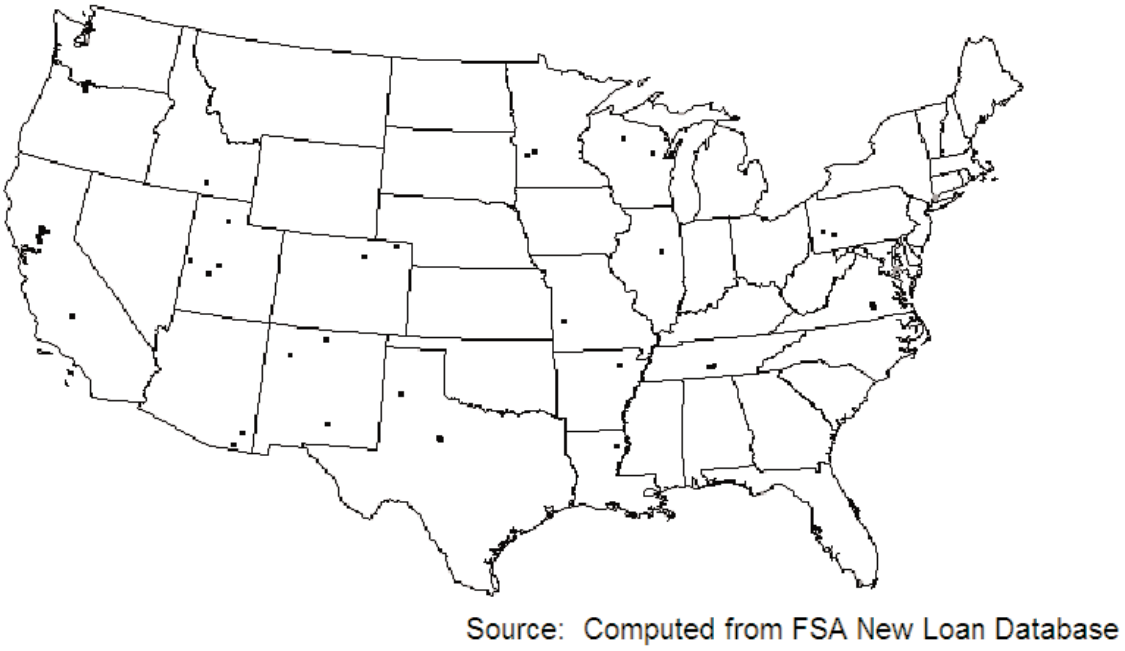
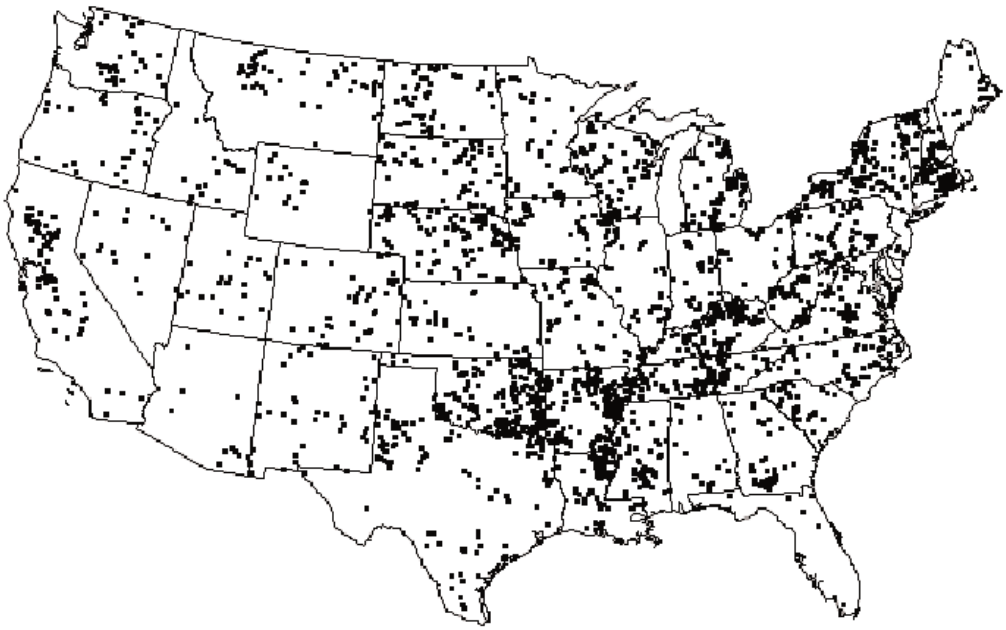


Figure 1.14. Distribution of Native Hawaiian or Other Pacific Islander farmers receiving FSA Direct Loans, FY 2000–2003

Source: Computed from FSA New Loan Database

Figure 1.15. Distribution of Hispanic or Latino farmers receiving FSA Direct Loans, FY 2000–2003

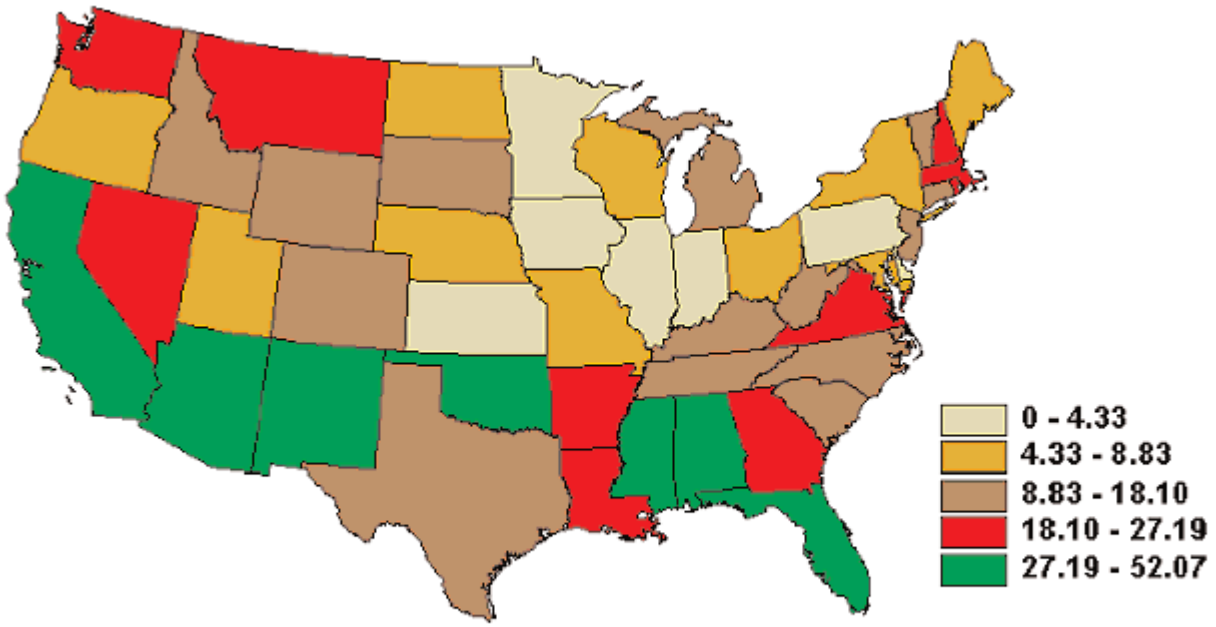


Source: Computed from FSA New Loan Database

Figure 1.16. Distribution of women receiving FSA Direct loans, FY 2000– 2003

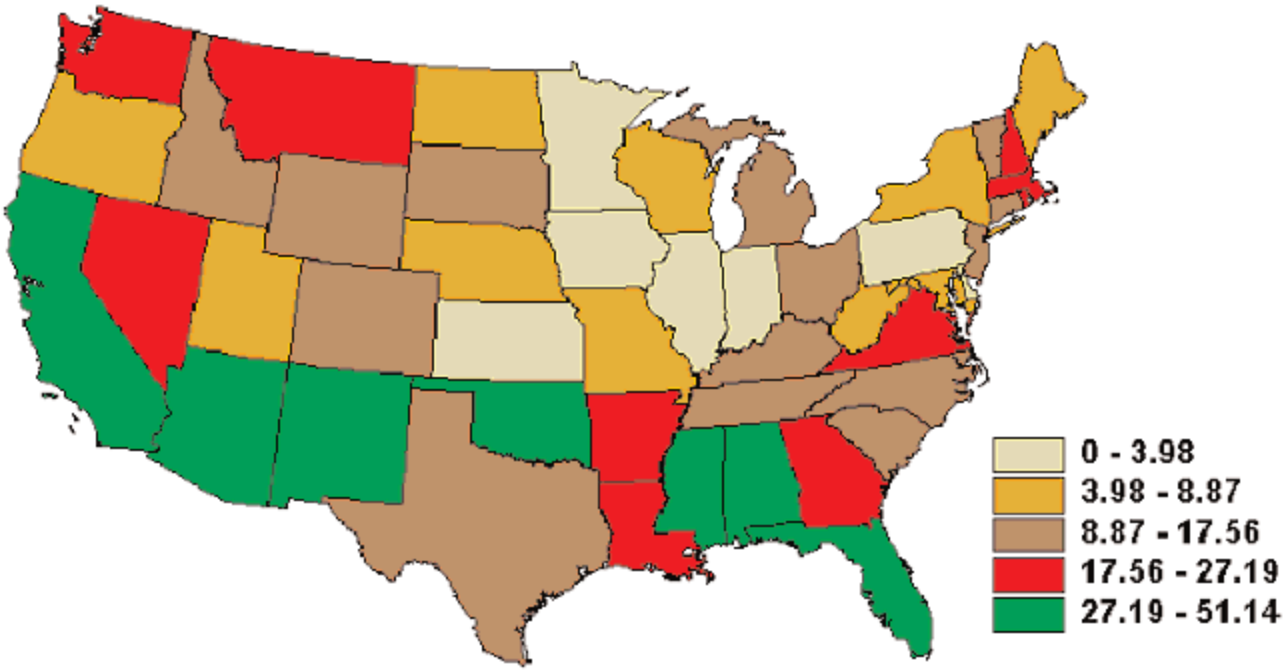
Figure 1.17 shows the percent of OL and FO loans made to SDA borrowers during FY 2000–2003. States in the southern and southwestern portions of the country, along with California, devote a larger proportion of their loans to SDA borrowers than do the states in the rest of the country in general. There are especially low percentages of SDA loans in the Northern Plains, Corn Belt, and Lake States regions. But as shown in figures 1.11, 1.12 and 1.15, SDA farmers are not concentrated in these three regions but are more heavily in the south and southwest.

The separate percentages of FSA OL and FO loans devoted to SDA borrowers are represented in figures 1.18 and 1.19, respectively. These maps echo the overall pattern presented in figure 1.17. In general, the southern portion of the country has a higher percentage of loans going to SDA borrowers than does the northern portion. The OL percentages are relatively stronger than the FO percentages in the Northwest portion of the United States, while the opposite is true of the Northeast and Appalachian regions. The overall average percentage of OL loans made to SDA borrowers during FY 2000–2003 was 13.7 percent and the overall average percentage of FO loans made to SDA borrowers was 17.9 percent.



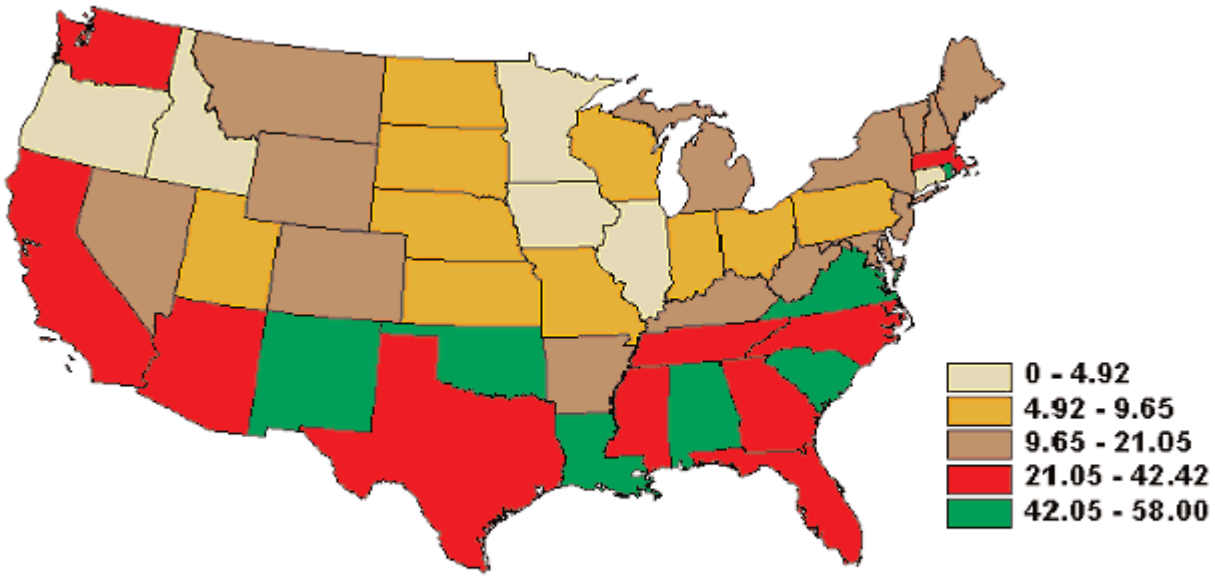
Source: Computed from FSA New Loan Database

Figure 1.17. Percentage of FSA OL and FO loans made to SDA borrowers, FY 2000–2003



Source: Computed from FSA New Loan Database

Figure 1.18. Percentage of FSA OL loans made to SDA borrowers, FY 2000–2003



Source: Computed from FSA New Loan Database

Figure 1.19. Percentage of FSA FO loans made to SDA borrowers, FY 2000–2003

In terms of proportions of loans made to SDA borrowers, 22 states exhibit SDA percentages of 15 percent or greater, and most of these states are concentrated in the southern portion of the country. The southern portion also has most of the SDA farmers except for women.

1.2.5. FSA Direct Loans to Beginning Farmer Borrowers

The Agricultural Credit Act of 1992 (P.L. 102-554) initiated FSA targeting of direct loan assistance to beginning farmers. Currently, the law requires FSA to "reserve or target loan funds for exclusive use by beginning farmers as follows: Direct Operating, 35 percent; Guaranteed Operating, 40 percent; Direct Farm Ownership, 70 percent; Guaranteed Farm Ownership, 25 percent. Funds remain targeted for beginning farmers in the guaranteed programs until April 1 of each fiscal year. In the direct programs, funds are targeted for beginning farmers until September 1 of each fiscal year" (USDA/FSA, 2004 a). EM loans are not specifically targeted to beginning farmers.

For FY 2000–2003 a total of 19,804 BF OL loans were originated with a total principal of $1,030,904,649. This averaged 4,951 loans per year with FY 2002 having the highest with 5,103 loans and FY 2000 having the lowest with 4,769 loans. The average BF OL loan size was $52,055 over the four years. By comparison, there were only 4,144 BF FO loans over the same four years for a total principal of $475,355,940. FY 2000 had the highest number with 1,262 loans whereas FY 2001 had the lowest number of loans with 903. The average BF FO loan size for the nation was $114,709 over the four years.

Figure 1.20 illustrates the average loan size by loan type to BF and non-BF borrowers by region. In general, the average BF OL loan size tends to be smaller than the average non-BF OL loan size. At a national

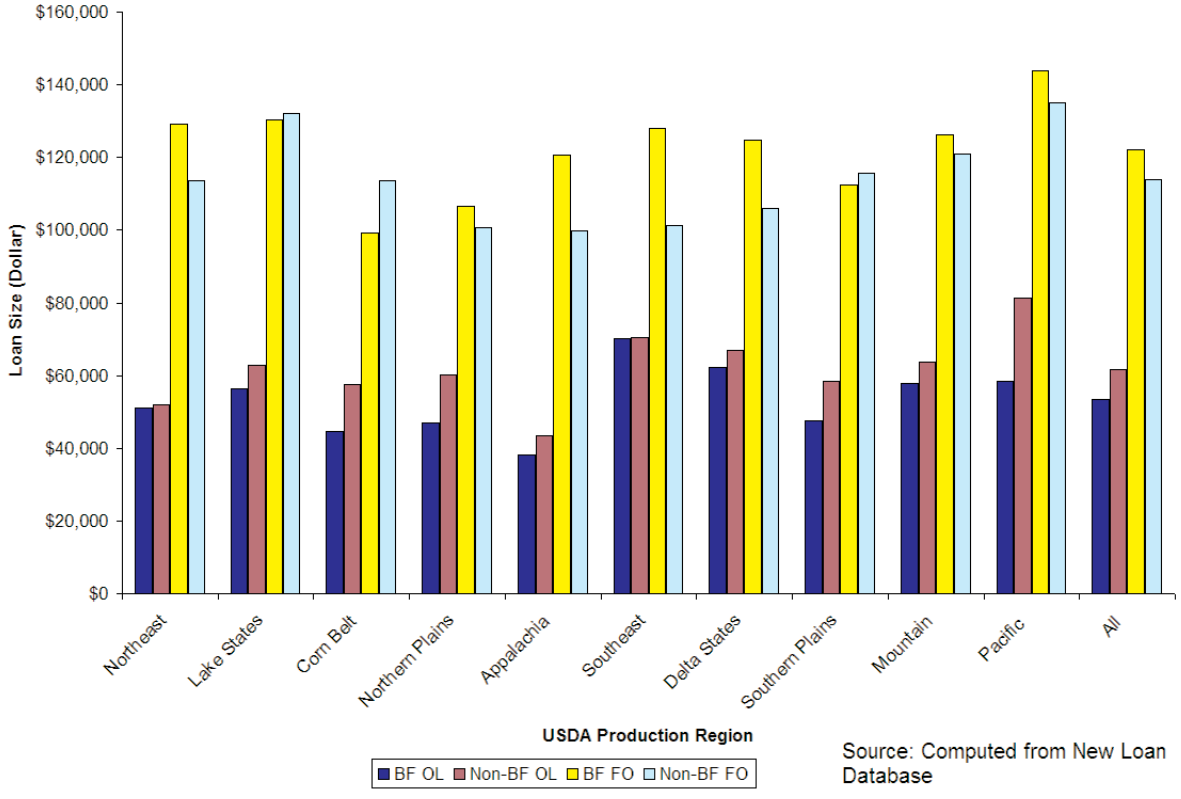
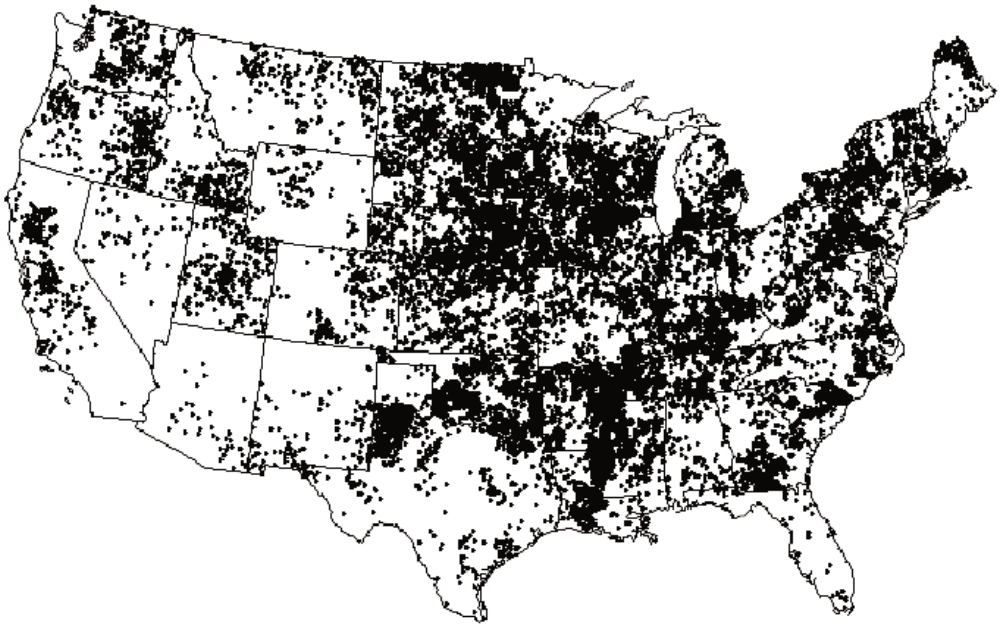


Figure 1.20. Average FSA loan size by type and USDA production region for beginning and non-beginning farmers, FY 2000–2003 four year average

level the BF OL loan size averaged $52,055 compared with $58,511 for non-BF OL loan size. The differences in average loan size between BF OL and non-BF OL range from a low of $252 for the Southeast region to a high of $23,008 for the Pacific region. Average BF FO loan size is generally larger than average non-BF FO loan size with the exception of the Corn Belt, Lake States, and Southern Plains regions.

Figure 1.21 shows the geographical dispersion of FSA BF borrowers.[16] Each dot on a map represents one BF borrower who received a new direct loan during the FY 2000–2003 period.[17] As the figure indicates, BF borrowers are spread throughout the country, but there are areas of high geographic concentration. In general, areas east of the Rocky Mountains have more BF borrowers than areas to the west of the Rocky Mountains. The Northern Plains, Delta States, and Lake States show especially high concentrations of beginning farmers.

Figure 1.22 shows the percentage of FSA Direct Loans devoted to beginning farmers. Over the four year span, 30 states made more than 40 percent of their direct loans to BF borrowers and eleven states made over half of their direct loans to BF borrowers. Delaware, Maryland, New Jersey, North Carolina, California, New Mexico, Massachusetts, Kentucky, Texas, and Indiana made the smallest percentage of loans to BF borrowers while Nevada, Louisiana, Arkansas, Georgia, Utah, Wisconsin, South Dakota, and Oregon made the largest percentage of loans to BF borrowers.



Source: Computed from FSA New Loan Database

Figure 1.21. FSA Direct beginning farmer borrowers, FY 2000–2003

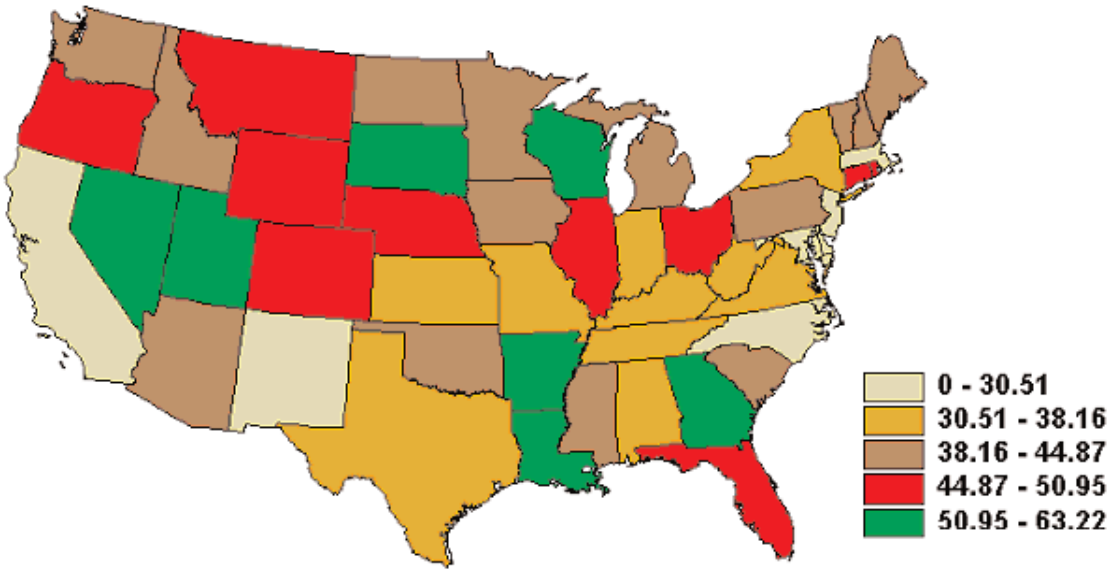
[16] A borrower is identified as a beginning farmer in the analysis below if the assistance code for the loan has a beginning farmer designation. Thus, if a borrower met the beginning farmer criteria but did not get a loan with a beginning farmer assistance code, the borrower would not be identified in our analysis as a beginning farmer. Conversely, if a borrower does have a beginning farmer assistance code but does not meet the FSA criteria, our analysis would still identify that borrower as a beginning farmer.

[17] If a particular individual received a loan in multiple years, they would show up as a dot for each year. In addition, if a borrower had more than one loan type in a given year (e.g. OL and FO) they would show up as a dot for each loan type they received.

The dollar volume of loans made also mirrors the number of loans made. For the U.S. as a whole, 38 percent of the OL volume (as measured by principal obligated) went to BF borrowers whereas 69 percent of the FO volume went to BF borrowers. Note that a much smaller portion of OL loans go to BF farmers than FO loans, which is consistent with the targeting of program funds at 35 and 70 percent, respectively.

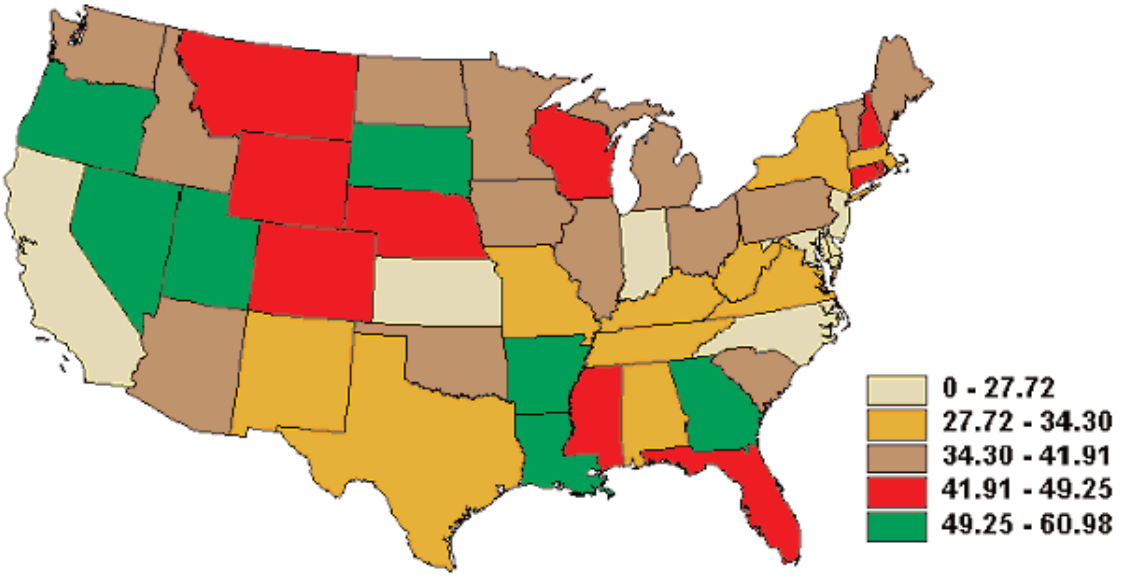
Figures 1.23 and 1.24 provide the separate percentages of FSA OL and FSA FO loans made to beginning farmers out of all OL and all FO loans, respectively, for FY 2000–2003. The maps confirm that a much higher proportion of FO loans went to BF borrowers compared with the proportion of OL loans that went to BF borrowers as was previously stated for the nation as whole. Every state with the exception of Delaware (which did not make any BF loans) made a greater proportion of FO loans to BF borrowers than they made OL loans. This difference is especially pronounced in the Corn Belt region, where a relatively low proportion of OL loans went to BF borrowers and a relatively high proportion of FO loans went to BF borrowers. Considering the 60,151 loans made over the four year period and counting by loan numbers, 39.8 percent of all direct loans (OL, FO, EM), 41.7 percent of direct OL loans, and 67.7 percent of FO loans, went to BF borrowers.

With the exception of Delaware, Alaska, California, and Maine, every state made over half of their FSA FO loans to beginning farmers. This is not surprising since 70 percent of the FO funds are targeted to BF operators.



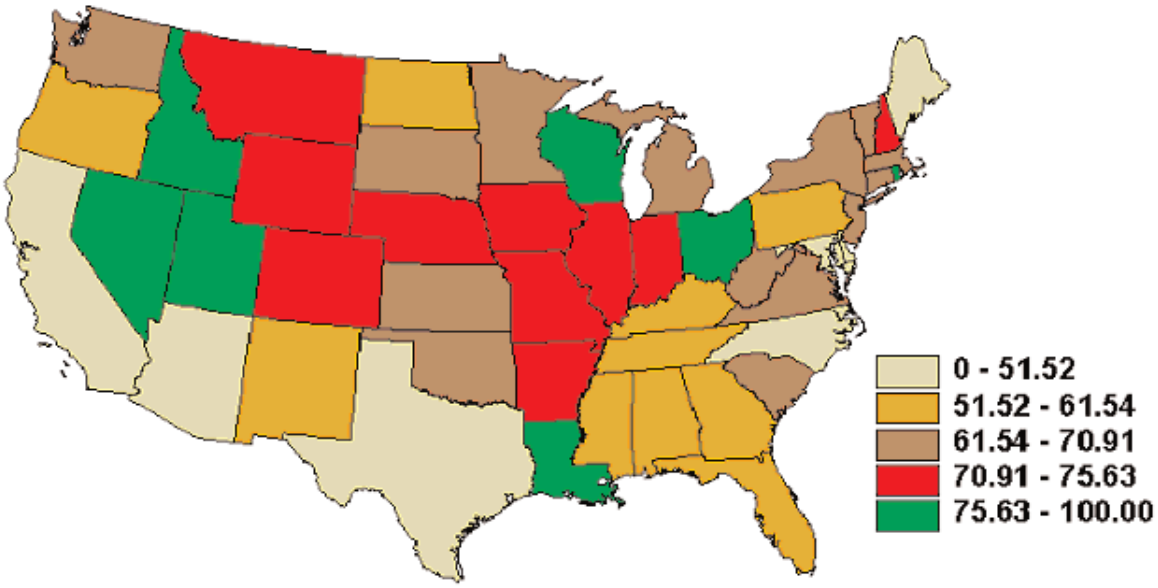
Source: Computed from FSA New Loan Database

Figure 1.22. Percentage of FSA Direct OL and FO loans made to beginning farmer borrowers, FY 2000–2003



Source: Computed from FSA New Loan Database

Figure 1.23. Percentage of FSA Direct OL loans made to beginning farmer borrowers, FY 2000–2003



Source: Computed from FSA New Loan Database

Figure 1.24. Percentage of FSA Direct FO loans made to beginning farmer borrowers, FY 2000–2003

1.3. FSA Direct Loan Market Penetration

One measure of the effectiveness of the Direct Farm Loan Program is a penetration ratio which we define as the proportion of the FSA loan-eligible farm population that receives direct loans in a given time-span. The penetration analysis in this study focuses on FSA borrowers who receive new loans instead of any farmer having an FSA Direct Loan at a given point in time. It is the characteristics of current originators that more accurately describe the current penetration of the market as opposed to counting all borrowers with active loans. In particular, FO loans can last a long time and may not be very reflective of the current emphasis and activities of FSA. But as pointed out later in this report, counting only recent borrowers vastly understates the number of farm operators who hold direct loans at any given point in time.

The market penetration ratio (in percentage terms) for a given loan type (OL, FO, or EM) and unit (state or county) is computed as:

$$(1.1)\quad Mkt.Pen._{Type,Unit} = \frac{\sum_{Year=2000}^{2003} Number\ of\ Unique\ Borrowers_{Year,Type,Unit}}{Number\ of\ Eligible\ Farm\ Operators_{Type,Unit}} * 100$$

where the numerator is calculated from the FSA New Loan database (FY 2000–2003) and the denominator comes from the 2002 Census of Agriculture database. The numerator is the sum of all unique FSA Direct borrowers receiving a particular type of new loan (OL, FO, EM, or some combination of the loan types) between FY 2000 and FY 2003. Unit describes the potential borrower population (all borrowers in a county, state, or nation; SDA borrowers in county, state, or nation; BF borrowers in a county, state, or nation; etc.). For each loan type, youth loans and duplicate borrowers are excluded. Thus, a single borrower receiving two OL loans and one FO loan within the four years is counted as one borrower for the purposes of OL penetration, one borrower for the purposes of FO penetration, and one borrower for the purposes of combined penetration.[18]

The denominator is the sum of all potential FSA loan-eligible applicants in a state (or county) for the year 2002 from the 2002 Census of Agriculture. Thus, the penetration rate can be viewed as the percentage of eligible farms FSA reaches with new direct loan assistance between 2000 and 2003.

To estimate the penetration ratios outlined above, it is necessary to define the cohort of eligible borrowers. Since FSA does not have precise rules for determining eligibility for direct loan assistance, an empirical approach using the 2002 Census of Agriculture data is employed to estimate the number of borrowers eligible at the county level.[19] Because the designation of which farms are FSA eligible is crucial in estimating penetration ratios, two different methods are examined. The first method is the basic method and the second is the logit method. One reason for exploring two methods is to measure how sensitive the penetration ratios are to the assumptions made.

The first method, called the basic method, designated farms into the eligible and non-eligible groups using a number of criteria. First, all farms in the FSA eligible pool must be a family organization.[20] Then the pool of FSA eligible farms was built by including family organizations with more than $500 in interest expenses on farm-related debt and annual sales in excess of $5,000. In addition, if a principal operator was under age fifty and had fewer than ten years

[18] The four-year period increases the number of data points used in the calculation. This approach is similar to Dodson and Koenig (2003) who used five years of county data in the numerator to increase the number of data points since many counties in their dataset had little FSA lending activity during a given year. While there are 45,016 unique borrowers within years, some of these borrowers are not unique across years. Across years, there are 28,852 unique borrowers indicating that some borrowers obtained loans in more than one year.

[19] Using ARMS data at the county level is untenable given the small number of observations in ARMS relative to number of counties in the U.S.

[20] In the Census the organization had to be family or individual operation, or a partnership, or a family-held corporation.

farming experience, they were added to the FSA eligible pool if not already in the pool. Principal operators who indicated farming as their primary occupation and who worked fewer than 200 days off-farm were added to the pool if not already in the pool. Finally there was one more exclusion criterion. If gross sales were $5,000 and less than $10,000 and the principal operator worked 200 or more days a year off-farm, the farm was deleted from the pool unless he/she was under age 50 and had been in farming for less than ten years.

The goal of the above criteria was to exclude hobby farms and farms with low debt since farmers in either of these groups are not likely to be in the market for FSA Direct Loans.[21] One could, in fact, argue for much higher minimum gross sales since $5000 in gross sales almost automatically implies the farm family has an alternative primary source of income. Farmers under 50 with ten or fewer years of experience are added to the pool even if their sales and debt levels are low because these can be legitimate characteristics of beginning farmers. Also, farm operators who indicated farming as their primary occupation are potential FSA clients. We exclude those claiming farming as a primary occupation but with more than 200 days of off-farm work since this situation strongly indicates that they are supporting themselves by off-farm work income.

This method categorizes 787,816 of 2,124,452 (37 percent) farmers in the U.S. as FSA eligible. This estimate is undoubtedly high since it does not consider the credit-elsewhere criteria. There are no data available to the researchers to show that a farmer met all the requirements for a loan elsewhere. Moreover, 378,595 or 48 percent of FSA eligible farmers qualified on the basis of being a beginning farmer; a beginning farmer is categorized as FSA eligible irrespective of other possible restrictions except family organization.

The above method is driven by precedents in the literature (Dodson and Koenig, 2003). However it is not a method tested against data in the sense of being able to determine if it is including and eliminating the proper set of eligible and non-eligible principal operators.[22] To implement an empirically based model, the ARMS datasets from 2000–2003 were used to estimate logit models that could predict which principal operators are loan originators in one or more of the four years 2000–2003. The estimated logit function was then applied to each farm operator enumerated in the Census of Agriculture to classify the farm operator as FSA eligible or ineligible. In the ARMS sample an observation was identified as FSA eligible if the operator had originated an FSA loan in the year of the ARMS sample. If the operator had not originated a loan, the operator was classified as FSA ineligible. The approach hypothesized that eligibility or ineligibility could be related to a set of independent variables on each farm operator. The conceptual basis of this approach is that FSA is lending to the appropriate group of farmers so that the logit function would identify principal operators who are FSA eligible as a function of the operator's observations on the relevant independent variables. This function was then applied to each farm operator as enumerated in the Census to classify each farm operator as to whether they were FSA eligible or not. Our justification for considering the two approaches was that they are based on very different methods and assumptions and should therefore give reasonable bounds on the FSA eligible market.

Ultimately we rejected the logit approach for identi-

[21] The 'Hobby Farm' criteria and nomenclature and the exclusion of low-debt farms are similar to that used by Dodson and Koenig (2003). Dodson and Koenig excluded farms as being FSA loan eligible if they reported no interest payments on farm debt for the 1997 agricultural census. Our definition allows some debt because a farmer with a small loan such as an outstanding line of store credit or a small variable input loan might be considered "debt-free" in the same sense that people who pay off all credit card balances monthly are considered "debt-free".

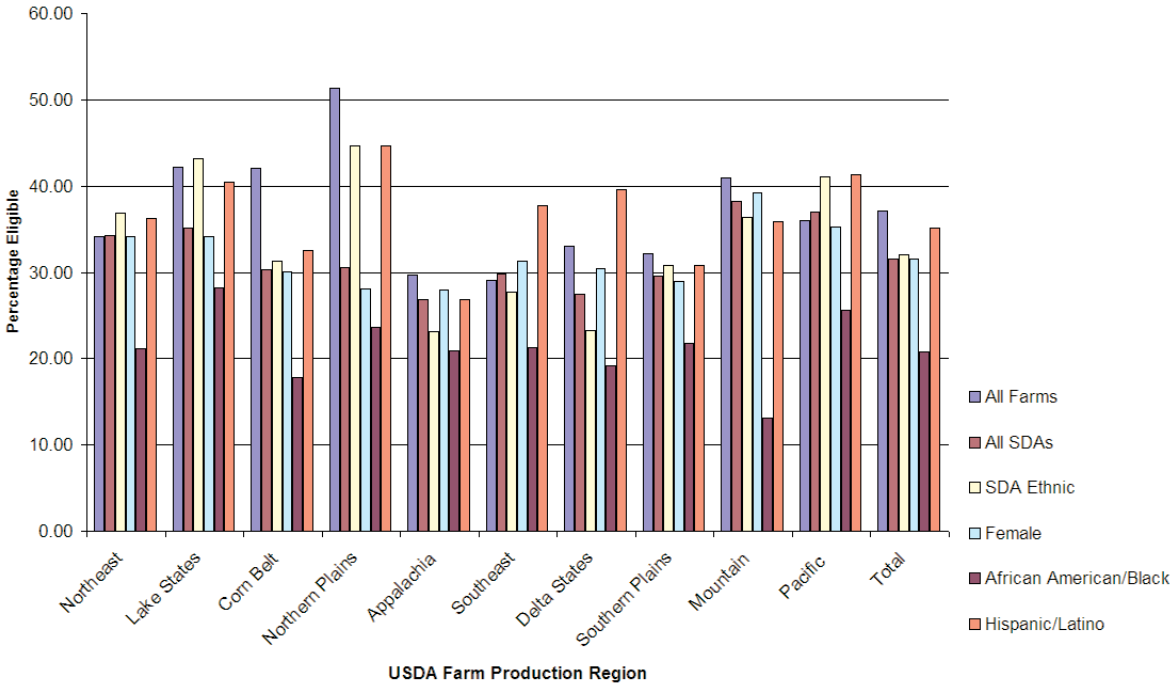
[22] The Census of Agriculture data do not indicate if a farmer holds any FSA debt.

fying the pool of FSA eligible borrowers. Several logit models were estimated using the ARMS data and one of them was applied to the Census data. We found that setting of the cutoff point on the index estimated for each farmer from the logit function caused very large shifts in the number of eligible farmers for seemingly small variations in this cutoff level. Furthermore, the ARMS data under-report the number of FSA current borrowers because operators only report up to five loans so that operators with more than five loans might omit their FSA loans and therefore be incorrectly classified as non-FSA borrowers. Finally, the underlying premise of the model is that FSA is currently lending to the eligible borrowers which is an assumption of part of what this study seeks to examine. Hence we use the basic method discussed above in the remainder of this study.

The distribution of FSA eligible borrowers is not uniform throughout the country. Figure 1.25 presents the proportion of FSA eligible farms as a percentage of total farms within cohorts by U.S. production regions. Considering every farm in the U.S., the proportion of FSA eligible farms ranges from 29 percent for the Southeast region to 51 percent for the Northern Plains. For all the SDAs combined, the proportion of FSA eligible farms ranges from 27 percent in the Delta States to 38 percent in the Mountain region. Among the different racial groups, African American has the lowest proportion of FSA eligible farms for all regions. In fact, there are no eligible black farms in many states including Alaska, Connecticut, Hawaii, Idaho, Maine, North Dakota, Rhode Island, Utah, and Vermont. Hispanics/Latinos have the largest proportion of FSA eligible farms in the Southeast, Delta States, and Pacific regions. In certain states, the proportion of FSA eligible Hispanic farms is very high. For instance in New Hampshire, greater than 90 percent of Hispanic farms are FSA eligible. Proportions of 50 percent or more FSA eligible Hispanic farms are observed in states such as South Dakota (68), Wisconsin (63), North Dakota (60), Iowa (58) and six other states. The proportion of FSA eligible female farms is smaller than the proportion for all farms except in the Southeast. The Northern Plains exhibit the largest disparity between female farms and all farms. So, we would expect some diversity in the number of loans based on the number of eligible borrowers and not due to program bias.

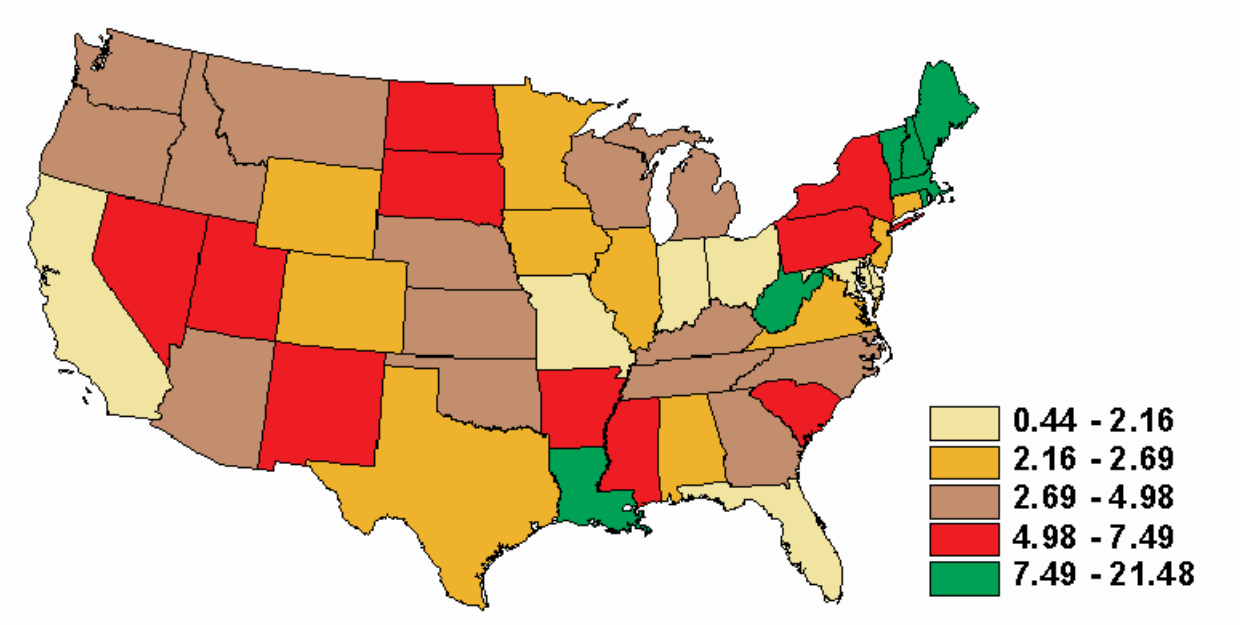
1.3.1. FSA Penetration in Family Farm Markets

Figure 1.26 shows the market penetration percentage of FSA into the potential direct FSA loan markets. It is apparent that there is considerable state-level heterogeneity in FSA market penetration. State-level variations in penetration are likely due to differences in: (1) variations in eligibility, (2) types of agricultural enterprises, (3) health of the agricultural economy, (4) composition of farms (i.e. states that typically have a greater proportion of 'large' farm enterprises would not be as heavily served by FSA programs and thus will have a lower market penetration), (5) occurrences of natural disasters, and (6) allocations of FSA Direct Loan obligation authority and lending practices.



Source: Computed from 2002 Census of Agriculture

Figure 1.25. FSA-eligible farms as a percentage of total farms by cohort, 2002

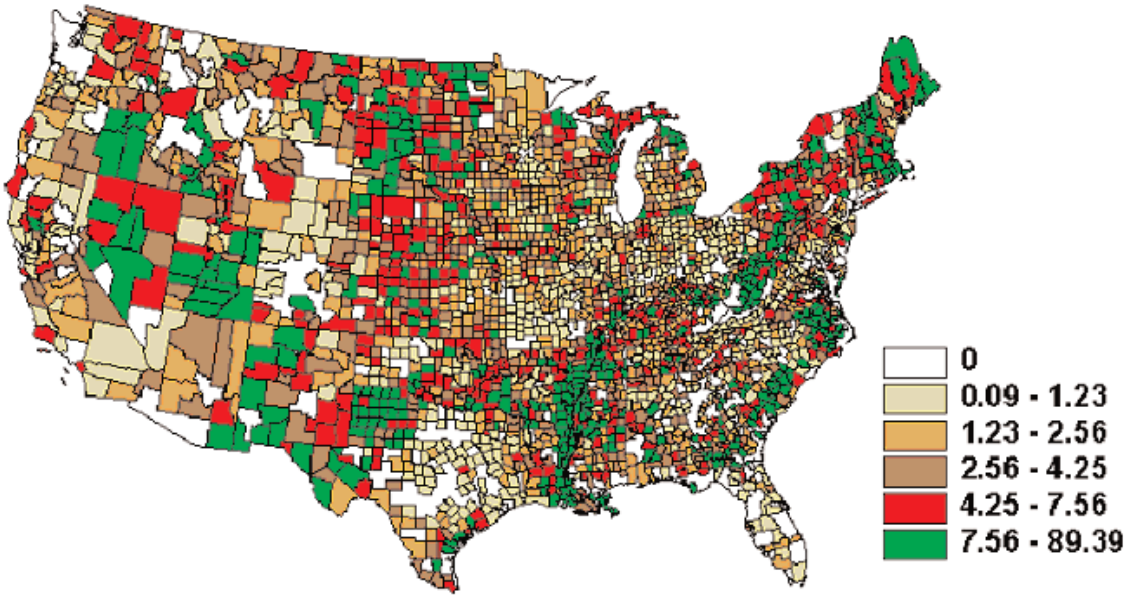


Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.26. All FSA Direct Loans market penetration percentage by state, FY 2000–2003

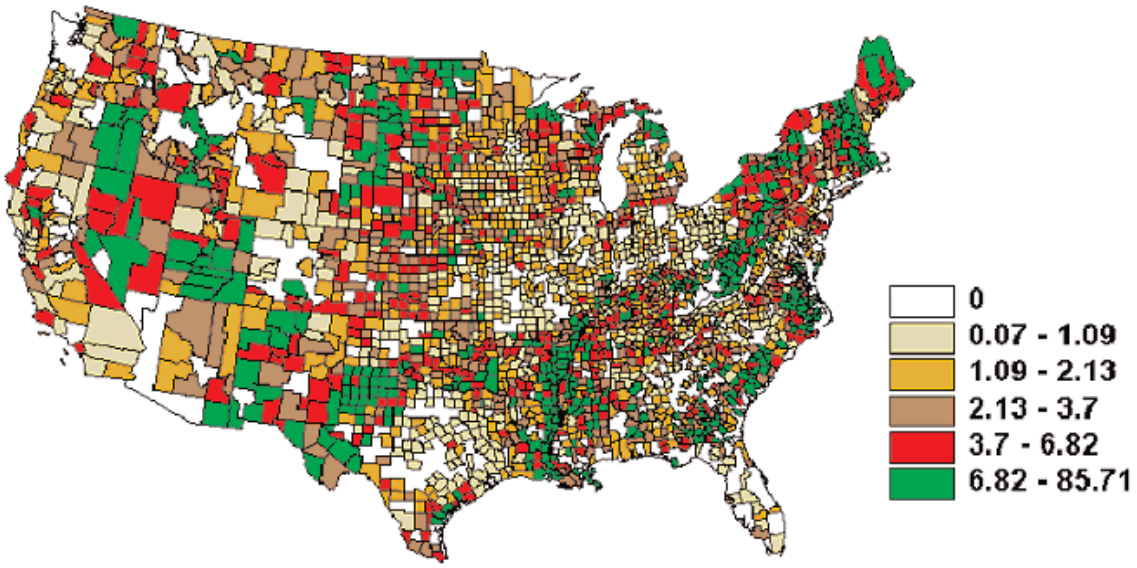
There were 28,852 unique borrowers for all FSA Direct Loans from FY 2000 – 2003 for the entire U.S. The estimated number of FSA eligible farm operators from the 2002 Census of Agriculture was 787,816. The 50-state penetration rate is 3.66 percent. This indicates approximately 3.66 percent of eligible farms received new FSA Direct Loan support during FY 2000 and 2003. At the state level, penetration ratios ranged from 0.44 percent for Delaware to 21.48 percent for Rhode Island. The disparity in penetration ratios is even more pronounced at the county level as shown in figure 1.27. County-level penetration ranged from 0 to 89 percent. Many counties (484 out of 3,076 U.S. counties) had 0 penetrations because there were no FSA Direct Loan recipients from these counties from FY 2000 to 2003. Among the counties with FSA Direct Loan recipients, Sonoma County in California had the least penetration of 0.09 percent while Bristo County in Massachusetts had the highest penetration of 89 percent. There are various pockets of concentration across the country. For example, the Northeast, Delta States, Texas Panhandle, Northern Plains, Coastal Plains, and some counties in the Mountain states have high penetration rates.

Figures 1.28, 1.29, and 1.30 illustrate the penetration of FSA into OL, FO, and EM loan markets, respectively. Clearly, OL loans have much higher penetration rates than FO or EM loans do. During the four-year period from FY 2000 to 2003, FSA made an average of 11,885 OL loans per year. This compares with 1,532 FO loans and 1,621 EM loans. Thus FSA makes about 7.75 times as many OL loans as they do FO loans, and 7.8 times as many OL loans as they do EM loans in any given year. Given that the same denominator is used for all three types of loans, (OL, FO, EM), the comparative magnitude of the calculated penetration ratios is as expected. While the OL map is quite similar to the overall map, the FO and EM maps show much greater variation across the country. Penetration rates for FO loans in the Northern Plains and the Midwest are generally higher than



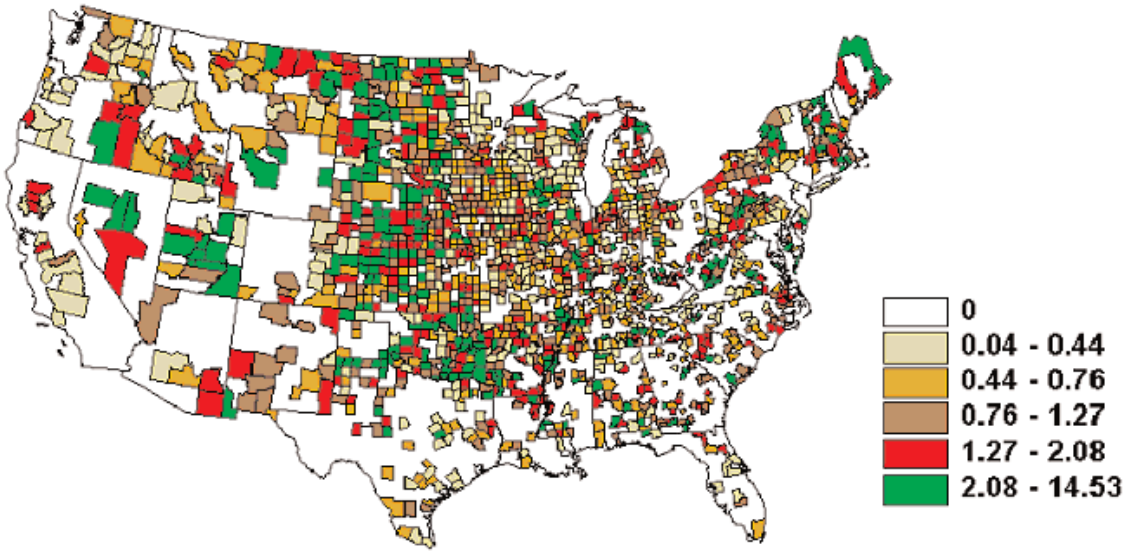
Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.27. All FSA Direct Loans market penetration percentage by county, FY 2000–2003



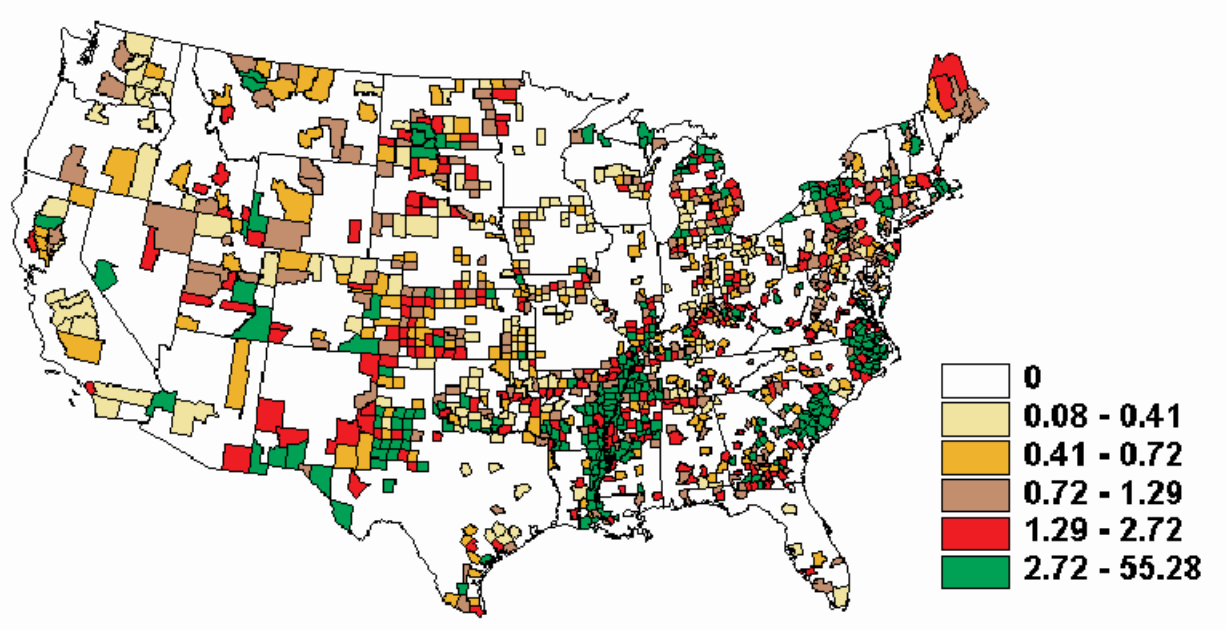
Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.28. FSA Direct OL market penetration percentage, FY 2000–2003



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.29. FSA Direct FO market penetration percentage, FY 2000–2003



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.30. FSA Direct EM market penetration percentage, FY 2000–2003

elsewhere in the country. The penetration rates of EM loans are highly dependent on the location of natural disaster declarations, but the EM loan penetration rates are higher in the Delta States, the Coastal Plains, areas of the Northern and Southern Plains, and the Northeast.

The state level penetration rates for OL and FO loans have a correlation coefficient of 0.61, which indicates a high degree of correlation between the two loan types. This indicates that states exhibiting a higher penetration rate for the OL loan program are likely to exhibit a higher penetration rate for the FO loan program (and vice versa). FO and EM loan penetration correlation coefficient is 0.57 while that of OL and EM loan is 0.56. These figures indicate that if a state penetrates higher in the FO or OL loan markets, it is likely to penetrate higher into the EM market, but this relationship is less pronounced than that of the relationship between OL and FO loans. This is undoubtedly due to the fact that EM loans are dependent on disaster declarations, which are not only localized within and across states, but irregular and unforeseen as well.

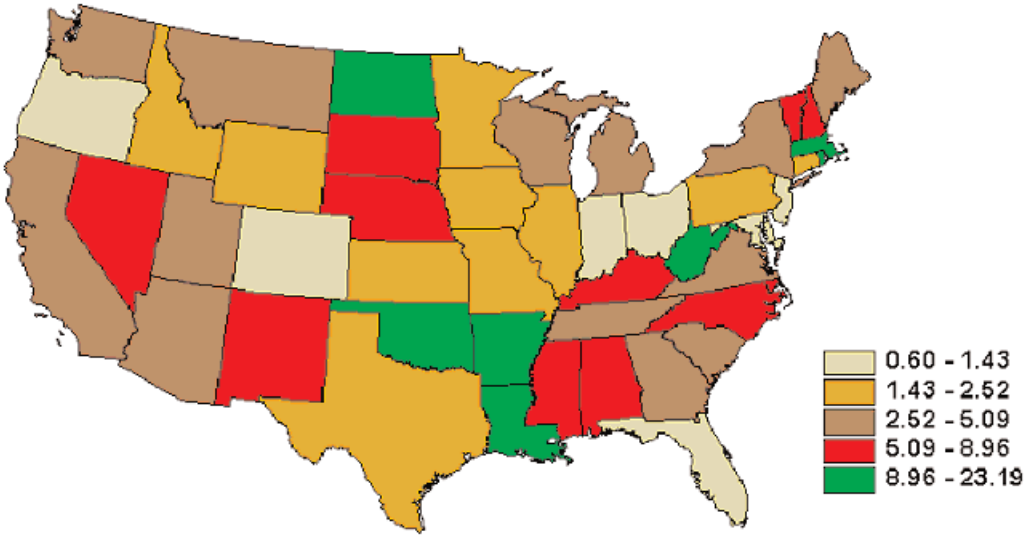
1.3.2. FSA Penetration in Small Family Farm Markets

FSA policy is concerned with helping smaller family farms. To measure how effectively this market is penetrated it would be useful to compute a penetration ratio for the small farm segment of the farm population. Unfortunately, data to do this in a straightforward manner are not available. Sales figures for direct loan borrowers were not available from the FSA databases. Therefore, the numerator of the market penetration number is estimated using ARMS data. Small farms receiving FSA Direct Loan assistance are those farms with sales of less than $250,000 reporting FSA as the source for one or more originated loans during the calendar year of the survey. Within the four-year period, ARMS estimated a total of 35,557 of these small farms. When the full set of basic method criteria are applied to 2002 Census of

Agriculture data with the additional criterion that sales are below $250,000, an estimated 694,859 farms are FSA eligible for the 50 states. However, the numerator from ARMS does not include Alaska and Hawaii. These states are therefore removed from the denominator. So, the denominator used for the small family farm market penetration calculation is the 48-state adjusted 693,388 FSA eligible farms from the 2002 Census of Agriculture, giving a penetration ratio of 5.13 percent for small family farms.

1.3.3. FSA Penetration in SDA Farm Markets

Over the four-year period from FY 2000 to FY 2003 in the 50-state region, there were 3,489 unique SDA OL borrowers and 1,065 unique SDA FO borrowers and a total of 4,040 SDA borrowers (OL and FO combined and adjusted for double counting).[23] Therefore, the numerator in our SDA OL and FO combined penetration calculation is 4,040. The denominator for the SDA penetration calculations is 101,195 FSA loan-eligible SDAs obtained from the 2002 Census of Agriculture. The calculated ratio based on these numbers is 3.99 percent. Counting SDAs solely on the basis of assistance types likely underestimates FSA penetration into SDA markets. For instance there are women and minorities who received EM loans or non-SDA loans. They are omitted in any SDA assistance code-based classification. To estimate the magnitude of undercounting resulting from the use of assistance codes, we counted all SDA qualified applicants who received an FSA Direct Loan including EM loans from FY 2000 to 2003. There are 4,676 SDA borrowers when SDA assistance code, gender, and race/ethnicity are used to classify a borrower as SDA. This results in a penetration ratio of 4.62 percent.



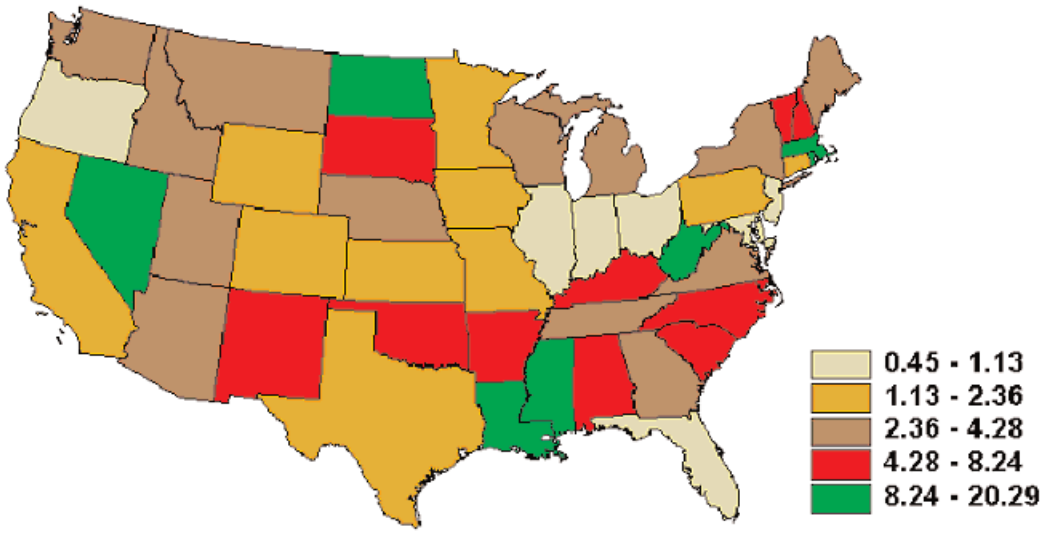
Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.31. FSA Direct SDA FO and OL combined market penetration percentage, FY 2000–2003

[23] A borrower is classified as an SDA borrower if the loan has an assistance code indicating an SDA loan. Thus, if a woman gets an OL loan with a non-SDA assistance code, she would not be counted in these totals as an SDA borrower. Conversely, any borrower having an SDA code is counted as an SDA borrower regardless of their reported demographics. While we collected demographic data, it was not complete nor will it ever be complete due to missing data in FSA records. However, all loans have an assistance code. The maps presented for SDA penetration are computed from assistance code-based counts.

Figure 1.31 illustrates the market penetration of FSA into the SDA market as a whole based solely on assistance code over the FY 2000–2003 period. Penetration rates are generally high in states where SDA borrowers are clustered. It may be that higher concentrations of SDAs lead to greater sensitivity of both FSA and potentially eligible applicants to making/applying for direct loans. Two states, Rhode Island and Alaska, exhibit penetration rates of 23.19 and 17.65 percent, respectively. The high rates may be a result of the fact that the states have relatively few SDA farms. Rhode Island made direct OL and FO loans to 16 SDA borrowers over the study period while having an estimated eligible base of 69. Alaska made direct OL and FO loans to nine SDA borrowers with an estimated eligible base of 51. Aside from the above two states, SDA penetration is highest in Massachusetts, Louisiana, Hawaii, Oklahoma, North Dakota, West Virginia, Arkansas, Nevada, Mississippi, and South Dakota. With the exception of Nevada, these states also exhibit a high concentration of SDA borrowers. Penetration is smallest in Delaware, Maryland, Florida, Ohio, Indiana, New Jersey, Oregon, and Colorado. The small family farm-penetration ratio of 5.13 is larger than the SDA penetration ratio of 3.99.[24] However, the ratios were estimated using different data sources for the numerators. The small-family farm numerator uses expanded farm counts from ARMS whereas the SDA numerator uses actual FSA SDA farm borrower counts. The small-family farm numerator contains EM loans that the SDA numerator does not contain. Therefore, the ratios are not directly comparable.

Figure 1.32 shows the market penetration of FSA into the SDA market with OL loans. The nationwide average penetration into the SDA OL market is 3.38 percent. Rhode Island has the highest penetration



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.32. FSA Direct SDA OL market penetration percentage, FY 2000–2003

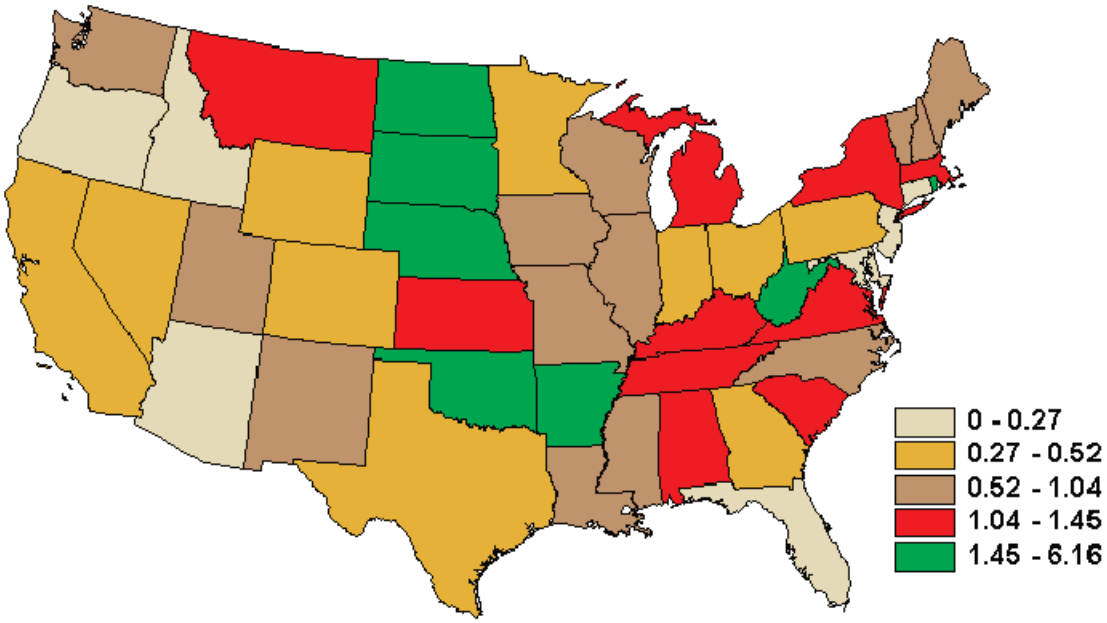
[24] Penetration for SDA based on assistance type alone counts only OL and FO loans. The penetration obtained by counting all female, all races/ethnicity other than white, and all SDA assistance codes (without double counting) is 4.62.

(20.29 percent) while Maryland has the least penetration (0.45 percent). The OL penetrations follow the same pattern as do the overall SDA penetrations. Out of all loans made to SDA borrowers, OL loans make up 86 percent of the total so it is not surprising that figures 1.31 and 1.32 follow a similar pattern.

Figure 1.33 illustrates the market penetration of FSA Direct Loans into the SDA FO market. Market penetration ranged from a high of 11.76 percent for Alaska to a low of zero percent for Connecticut while the U.S. average is 1.02 percent. The pattern of the FO map shows strong similarities to the pattern of the OL map. In general, the Southeast region has less penetration of the FO market than the OL market, while the Northeast region has greater penetration into the FO market. The correlation coefficient between SDA FO and SDA OL penetration is 0.67, which indicates a fairly strong degree of correlation between the two figures.

Female borrowers are an important segment of SDA borrowers. FSA made fewer loans to women than the racial/ethnic SDA population resulting in a lower market penetration rate for women since more women are estimated as FSA eligible than are racial/ethnic operators. About 32 percent of women operators (73,435 of 232,668) are estimated as FSA eligible. Similarly, about 32 percent of all SDAs are FSA eligible (table 1.5.). For FY 2000–2003, 1,922 women originated 3,669 FSA Direct OL, FO, and EM loans resulting in a penetration ratio of 2.62 percent. Thus, the comparable estimate of 4.62 percent for all SDA implies that FSA penetration is higher for SDA ethnic market than for SDA gender market.

As figures 1.11–1.16 presented earlier illustrate, SDA borrowers tend to be clustered in specific geographical regions. This is primarily due to historical population settlement factors. Thus, the SDA market is very thin in some states.



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.33. FSA Direct SDA FO market penetration percentage, FY 2000–2003

Table 1.5 lists the average annual number of farms by race and eligibility type estimated from the 2002 Census of Agriculture. As table 1.5 shows, between 21 and 43 percent of the total number of farms in any given SDA class and 32 percent of all SDA classes combined are classified as eligible. The basic method classified 37 percent of all 2,128,982 farms as eligible. Thus, the eligibility percentages for SDAs are slightly lower than the eligibility percentage of the general population. This is due to the fact that relatively more SDA-type farms, especially African American farms, are classed as hobby or low debt than their non-SDA peers.

1.3.4. FSA Penetration in Beginning Farmer Markets

The criteria for beginning farmer eligibility differ between OL and FO loans. For OL loans, a farmer is eligible for BF assistance if he or she has operated a farm or ranch for ten years or less (USDA/FSA, 2004 c). For FO loans, a farmer is eligible for BF assistance if he or she has operated a farm or ranch between three and ten years and "does not own a farm greater than 30 percent of the average farm size in the county" (USDA/FSA, 2004 c). In order to characterize market penetration, two sets of BF eligible borrowers are estimated from the 2002 Census of Agriculture data. The first set pertains to OL eligible farms and consists of FSA eligible farms with ten years or less of farming experience. The second set corresponds to FO eligible farms and consists of FSA eligible farms with three to ten years of experience and owning acreage less than or equal to 30 percent of the county average farm size (as computed from the 2002 Census of Agriculture).

Figure 1.34 portrays the annual market penetration rates of FSA into the BF market as a whole (both OL and FO) over the four-year time frame of the study. The 'market' used for the denominator of the penetration rates for this map is BF OL eligible farms. This is a less restrictive definition of beginning farmer, and it is appropriate as a denominator since the numerator is a combination of BF OL and BF FO borrowers.[25] The estimated penetration ratios ranged from 0.48 to 20.13 percent. Excluding Rhode Island with a penetration ratio of 20.13 percent reduces the upper limit of the range to 10.00 percent. Even considering the reduced range, there is still a wide variability in market penetration.

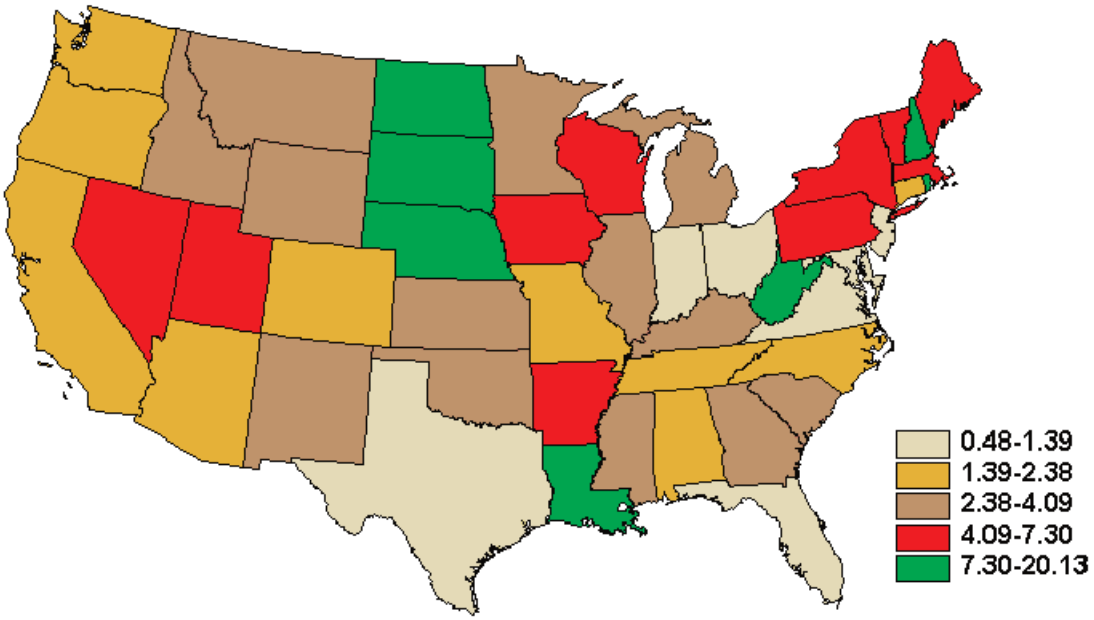
Penetration is highest for Rhode Island, the Dakotas, Nebraska, Alaska, Louisiana, and New Hampshire. The Del-Mar-Va region, Texas, Florida, New Jersey,

Table 1.5. Estimated number of FSA-eligible farms by race and gender

Race	FSA-eligible	Non-FSA eligible	All	Percent eligible
Black or African American	6,281	24,008	30,289	21
American Indian or Alaskan Native	7,815	12,967	20,782	38
Hispanic or Latino	17,424	32,108	49,532	35
Hawaiian Native	298	516	814	37
Asian	2,905	3,901	6,806	43
Women	73,435	159,233	232,668	32
SDA ethnic	31,274	66,385	97,659	32
SDA	101,195	219,093	320,288	32

Source: Computed from the 2002 Census of Agriculture

[25] "Combination" means that if an individual had both an OL and an FO loan within the four years, then they were only counted once in this map. So, it would not be correct to call it the "sum" of OL and FO loans.



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.34. FSA Direct beginning farmer FO and OL combined market penetration percentage, FY 2000–2003

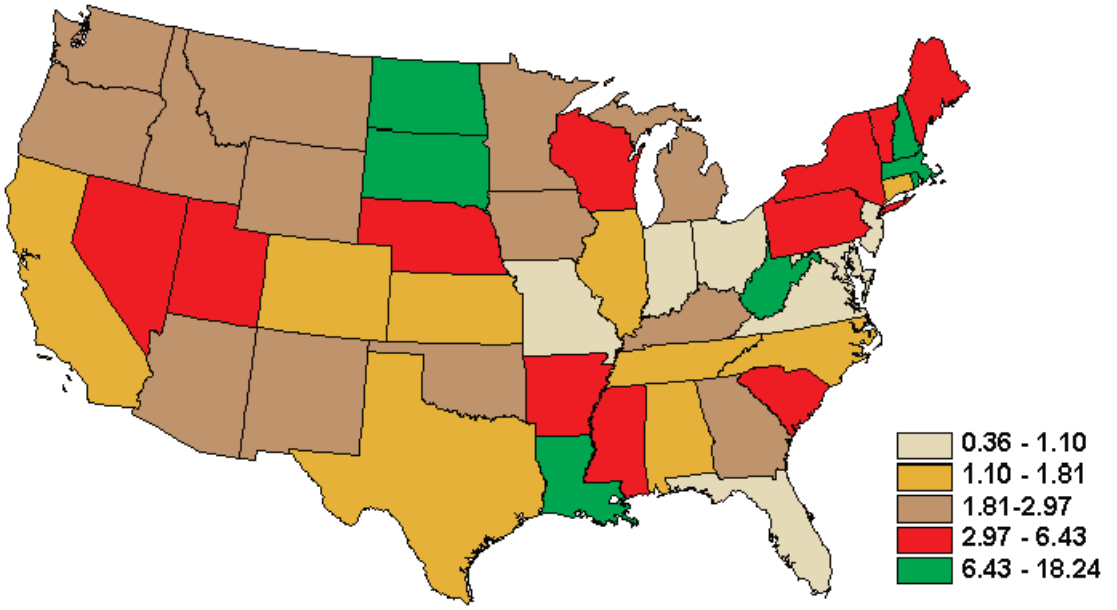
Ohio, and Indiana all exhibit low penetration numbers. The low penetration rates in California, Texas, and Florida probably reflect the large scale agriculture characteristic of those states. The large scale implies that the limits on the loan sizes ($200,000) may not be sufficient to allow a large number of beginning farmers to purchase a commercially viable farm with such limited resources.

Figures 1.35 and 1.36 illustrate the separate average annual penetration rates for the BF OL and BF FO markets, respectively. Regional penetration patterns remain largely the same as the combined map (figure 1.34). The Northern Plains and most of the Lake States regions demonstrate increased penetration into the BF FO market relative to the BF OL market.

In general, the disparity of penetration rates across states is generally less for FO loans at the lower penetration levels. Forty states have a penetration rate less than or equal to 3.68 percent for FO whereas in the OL market the rate in order of penetration rate for the 40th state is 6.12 percent. This pattern reverses for high penetration rates where FO loan rates have wider dispersion. Further analysis is necessary to determine the reasons for this variability. A disparity in land cost across regions could be a factor. For example, land value in Montana ($390 per acre for land and buildings in 2003) is low compared with land value in Connecticut ($9,500 per acre for land and buildings in 2003) (USDA/NASS, 2004 a). But the mix of operating and land costs for various crops might also be a factor resulting in larger heterogeneity.

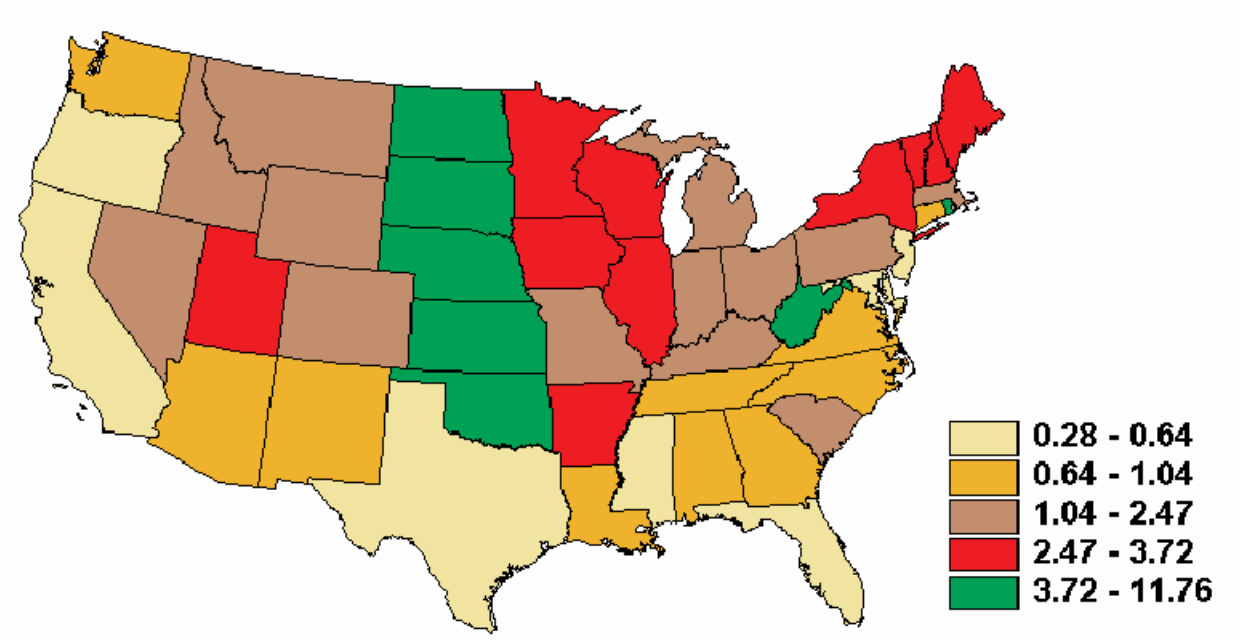
1.3.5. Summary of Market Penetration for FSA Direct Loan Programs

Table 1.6 provides a summary of the calculated market penetration percentages for various FSA Direct Loan markets. The table indicates that the penetration percentage for any of the cohorts ranges between 3.16 and 5.13 percent. Beginning farmers seem to



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.35. FSA Direct beginning farmer OL market penetration percentage, FY 2000–2003



Source: Computed from FSA New Loan Database and 2002 Census of Agriculture

Figure 1.36. FSA Direct beginning farmer FO market penetration percentage, FY 2000–2003

Table 1.6. Calculated penetration percentages by cohort

Category	OL	FO	OL and FO combined	OL, FO, and EM combined
Small family farm	na	na	na	5.13*
Beginning farm**	2.49	2.04	3.16	na
SDA farm	3.38**	1.02**	3.99**	4.62***
All family farms	2.93	0.76	3.37	3.66

Sources: 2002 Census of Agriculture, New Loan Database, and ARMS data.
* Numerator is estimated from ARMS data and therefore includes all FSA borrowers.
** Numerator is based on loan assistance type.
*** Numerator includes loans by SDA assistance type and non-SDA loans to women and ethnic/racial minorities.

have benefited from targeting, especially in FO loans, while SDAs seem to have benefited most from OL loans. The fact that the SDA rate of 4.62 is greater than the overall 3.66 rate suggests targeting has directed more loans to SDA borrowers than would otherwise happen. But SDA borrowers may be better financially qualified and would therefore receive more loans without targeting. This issue is investigated later. Overall, penetration into FO markets is smaller than OL markets probably due to the lower proportion of FO loans made.

It is clear that market penetration varies considerably across the states. Dodson and Koenig (2003) attribute this to varying levels of financial stress, accessibility to FSA service centers, state loan allocations, and the presence of beginning and women farmers. Thus it makes sense that varying penetration rates would be observed across states because the above factors are not distributed uniformly across states.

The actual penetration rates themselves appear at first glance to be small. However it must be remembered that these are rates of new loan originators. When these figures are adjusted to account for current holders of FSA debt, the level of market penetration appears much stronger. That is, when ARMS data were used to estimate the number of farmers holding some form of FSA Direct Loans, we found the number of new originators plus old originators is about five times the number of only new originators. Thus if penetration is viewed as percent of the market holding some form of FSA Direct Loans, the ratios would increase by roughly a factor of five.

It is our opinion that the actual penetration rates are much higher than estimated above. The definition of the denominator is very inclusive. Farms with sales over $5,000 are included as well as any farmer under age fifty with less than ten years of experience.[26] These two criteria are minimal. If these criteria were tightened up such as making the minimal gross cash sales $25,000 or $50,000, the numbers of FSA eligible farmers would plummet. As the ARMS data show, the average new FSA borrower had gross cash farm income of about $196,000. Decreasing the number of FSA eligible farms would correspondingly increase the penetration ratios since the numerators would remain unchanged. Although our definition is consistent with the literature (Dodson and Koenig, 2000) and there is no "true" definition, the resulting estimates are almost certainly far too low. The best use of the rates is for comparisons with different regions, loan types, and borrower sub-groupings—but *not* as reliable indicators of FSA reaching all those in need of their Direct Loan Programs.

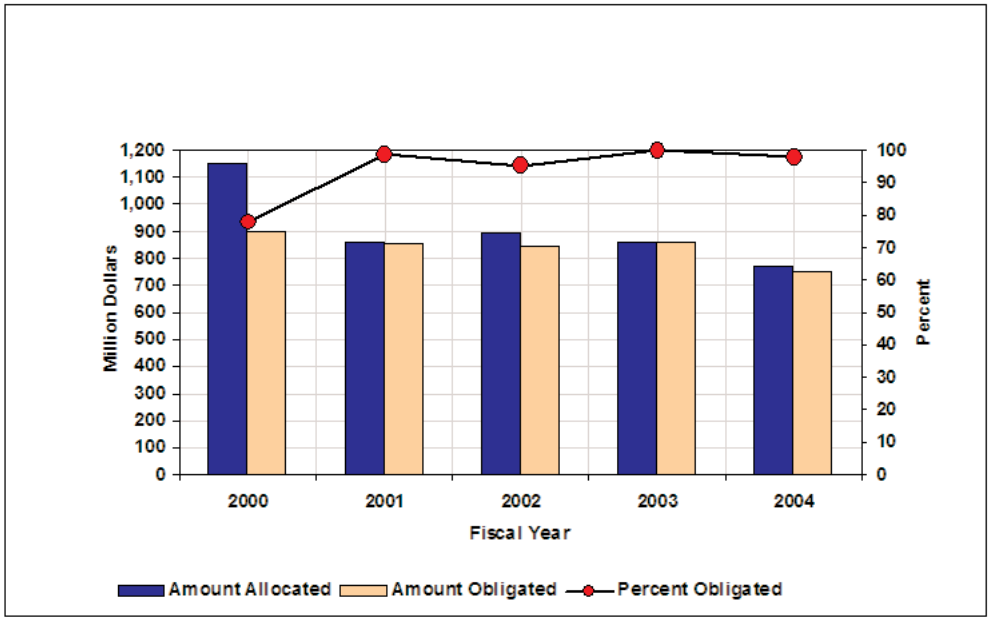
[26] This also assumes non-corporate ownership but this removes relatively few farms.

The amount of money allocated to FSA lending is a major limiting factor in market penetration levels. Figure 1.37 presents the amount of money allocated to FSA from FY 2000 to 2004 and the amount obligated by the end of the fiscal year.

The figure shows that almost the entire amount allocated to FSA is obligated by the end of the fiscal year except for FY 2000. In fact, 95 to 100 percent of the allocated amount was obligated by the end of each fiscal year for 2001-2004. Therefore, for FSA to make more loans than it is currently making, it would need more allocations or to reduce the principal obligated to borrowers on average so more funds are available to serve additional borrowers.

1.4. Financial Characteristics of FSA Borrowers

Farm operators capable of obtaining credit from conventional sources should not be receiving FSA Direct Loans. As a part of measuring effectiveness, it is important to determine if FSA borrowers are distinctly in financially weaker circumstances than those operators not receiving FSA credit. To determine if such differences exist, it is necessary to compare the financial characteristics of FSA borrowers with non-FSA borrowers. The only data source available for such a comparison is ARMS. As mentioned previously, the Census of Agriculture does not collect detailed financial information. Detailed financial information on FSA borrowers is available for many FSA borrowers in the FHP data but it is problematic to use it to compare with ARMS data on non-borrowers. The difficulty is that the ARMS financial data are gathered at year's end whereas the FHP data can be collected at any time of the year and the definitions of the variables are somewhat different. To control for these differences it is necessary to use ARMS data for both FSA borrowers and non-FSA borrowers for comparison purposes. FHP data are subsequently used when comparing various FSA borrower groups.



Source: Computed from FSA Monthly Management Summaries, September 2000 - 2004

Figure 1.37. Combined FSA Direct OL and FO loan allocations vs. obligations, as of September 30, FY 2000–2004

In order to assess the comparative financial strengths of the different FSA borrower groups and non-FSA borrowers, five financial characteristics are measured in the various sections that follow:

a. *Solvency.* Measured by the debt-to-asset ratio which is computed by dividing borrowers' debts by assets; farm assets and farm debts are used for ARMS data, and total farm and non-farm assets and debts are used for FHP data;
b. *Liquidity.* Measured by the current ratio which is computed by dividing current assets by current liabilities;
c. *Profitability.* Measured by the rate of return on assets which is computed for the FHP data by the planned net farm income minus planned family living expenses all divided by total assets;
d. *Repayment capacity.* Measured by the term debt coverage ratio when using ARMS data which is computed by dividing net farm income plus off-farm income plus depreciation plus interest minus estimated income tax expense minus family living expenses by scheduled principal and interest payments; a similar measure of repayment capacity when using FHP data is computed by dividing the balance available to service principal and interest payments by the total amount of principal and interest payments due in current year; and
e. *Financial efficiency.* Measured by the asset turnover ratio which is computed by dividing gross farm income by farm assets; and the operating expense ratio which is computed by dividing total cash operating expenses by gross cash farm income.

Under normal conditions, a borrower's financial strength is expected to be inversely related to the debt-to-asset-ratio and operating expense ratio, and directly related to the current ratio, profitability, repayment capacity, and asset turnover ratio.

1.4.1. Comparative Financial Characteristics of FSA Eligible Farmers

Table 1.7 lists selected financial characteristics of FSA eligible farm operators obtained from the ARMS data. Those classified as FSA new recipients are eligible farms receiving at least one FSA-sourced loan in the calendar year of the ARMS survey. Farms classified as FSA old recipients are eligible farms reporting FSA-sourced loans but not listing any FSA-sourced loans originated in the calendar year of the ARMS survey. Non-FSA recipients include all the remaining FSA eligible farms in the ARMS data.

Because the figures reported in table 1.7 are estimates based on the ARMS survey, they are accompanied by their standard errors. The standard errors were computed using the delete-a-group jackknife procedure (Dubman, 2000). Dubman states that the use of classical variance formulas is not appropriate because of the ARMS survey's complex, multi-phase, probability-weighted sampling design and changes in weight estimation. The standard errors are used for testing if the observed differences are statistically significant. To evaluate whether or not the observed differences between means are statistically significant, t-statistics at the 5 percent level of significance (two-tailed) and 28 degrees of freedom with a critical t-value of 2.048 are computed for each of the three possible two-way comparisons.[27]

In terms of estimated means, the FSA borrowers (new and old recipients) generally have higher gross cash income, cash expenses, net cash farm income, net farm income, farm assets, and farm liabilities than those of their non-FSA but eligible counterparts. However, only the difference in cash expense for FSA new recipients compared with non-FSA recipients is statistically significant. The more revealing differences are in equity and financial ratio comparisons. The non-recipients have higher mean farm equity than the loan recipients and the difference between

[27] The statistics do not have exactly a t-distribution but the critical value is more conservative than assuming a standard normal distribution.

old recipients and non-recipients is statistically significant. In general, FSA debtors have higher average debt-to-asset ratios (indicating lower solvency) than the non-borrowers and these differences are statistically significant. The new and old recipients have average debt-to-asset ratios of 38.2 and 36.1 percent, while non-FSA farms have a debt-to-asset ratio of 23.5 percent.

In terms of term debt coverage ratio (a measure of repayment capacity), which indicates the average level of funds available for every $1 of principal and

Table 1.7. Financial characteristics of FSA-eligible farms by debt type, 2000–2003 average

	FSA status			t-values		
	FSA new recipients (a)	FSA old recipients (b)	Non-FSA recipients (c)	a-b	a-c	b-c
Number of farms	7,724	30,719	792,686			
Farm operation income statement						
Gross cash income	196,292	160,484	144,410	1.23	1.97	1.07
	(25,601)	(13,718)	(6,215)			
Livestock income	50,739	62,395	50,016	-0.87	0.06	1.78
	(11,823)	(6,394)	(2,773)			
Crop income	98,263	53,660	62,210	2.91*	2.65*	-1.06
	(13,314)	(7,567)	(2,901)			
Government payments	23,557	17,059	11,854	1.77	3.45*	3.69*
	(3,388)	(1,399)	(184)			
Other farm-related income	23,734	27,369	20,330	-0.78	1.01	1.98
	(3,196)	(3,413)	(1,020)			
Less: Cash expenses	165,240	128,931	117,546	1.22	2.148*	0.55
	(21,839)	(20,167)	(4,570)			
Variable expenses	119,067	93,257	89,172	1.06	1.73	0.23
	(16,884)	(17,408)	(3,885)			
Fixed expenses	46,173	35,674	28,375	1.51	2.83*	2.31*
	(6,247)	(3,074)	(745			
Real estate & property taxes	2,955	2,980	2,888	-0.05	0.14	0.39
	(455)	(218)	(90)			
Interest expenses	13,943	14,755	10,350	-0.35	1.83	3.26*
	(1,917)	(1,273)	(449)			
Insurance premium	6,755	5,056	4,001	1.69	2.93*	2.74*
	(936)	(370)	(102)			
Rent & lease payments	22,521	12,884	11,136	2.41*	3.15*	1.00
	(3,608)	(1,730)	(263)			
Net cash farm income	31,052	31,552	26,864	-0.04	0.49	0.53
	(8,410)	(8,607)	(1,862)			
Less: Depreciation	19,184	19,211	14,553	-0.01	1.33	3.68*
	(3,447)	(1,129)	(573)			
Labor, non-cash benefits	491	344	354	0.54	0.63	-0.06
	(214)	(167)	(31)			
Plus: Value of inventory change	11,393	6,634	5,016	1.07	2.01	0.50
	(3,110)	(3,187)	(630)			
Non-money income	3,952	4,492	5,450	-0.92	-2.81*	-3.24*
	(520)	(273)	(115)			
Net farm income	26,723	23,123	22,423	0.34	0.56	0.09
	(7,518)	(7,457)	(1,793)			

Table 1.7. Continued.

Item	FSA status			t-values		
	FSA new recipients (a)	FSA old recipients (b)	Non-FSA recipients (c)	a-b	a-c	b-c
Farm operation balance sheet						
Farm assets	714,885	689,680	700,124	0.27	0.17	-0.18
	(80,934)	(45,920)	(33,913)			
Current assets	112,581	74,646	74,669	1.88	2.00	0.00
	(18,799)	(7,338)	(2,655)			
Non-current assets	602,305	615,034	625,455	-0.16	-0.32	-0.20
	(66,122)	(40,050)	(31,778)			
Farm liabilities	219,277	216,062	124,567	0.11	3.66*	5.99*
	(25,414)	(14,473)	(4,903)			
Current liabilities	79,508	53,621	38,398	2.51*	4.37*	3.10*
	(9,242)	(4,566)	(1,791)			
Non-current liabilities	139,769	162,440	86,169	-1.06	2.88*	6.55*
	(18,342)	(11,172)	(3,274)			
Farm equity	495,608	473,618	575,557	0.31	-1.17	-2.20*
	(61,740)	(35,957)	(29,381)			
Current ratio	2.21	3.93	22.44	-1.02	-5.20*	-4.40*
	(0.40)	(1.64)	(3.87)			
Debt-to-asset ratio (%)	38.21	36.11	23.48	0.60	3.97*	4.80*
	(3.07)	(1.61)	(2.08)			
Term debt coverage ratio	4.15	2.76	7.07	0.63	-1.35	-4.47*
	(2.06)	(0.71)	(0.65)			
Asset turnover ratio	0.35	0.28	0.50	2.23*	-1.77	-2.52*
	(0.02)	(0.02)	(0.09)			
Operating expense ratio (%) **	84.18	80.34	81.40			

Source: Computed from ARMS data. The standard errors for the estimates (in parentheses) are computed using a jackknife procedure

*The t-values followed by asterisks indicate that the differences between the means are significant at the 5 percent level at 28 degrees of freedom and a critical t-value of 2.048 (two-tailed test).

** We used the ratio of the four-year mean cash expenses and gross cash income to compute this variable because the means of the ratios computed from individual ARMS observations gave extremely high, unrealistic values. Standard errors are not computed since it is not clear what the appropriate jackknife procedure would be.

interest payments due on term debt, the non-FSA farms have the highest average value at 7.07 followed by new recipients at 4.15, but the difference between the two is not statistically significant. Old FSA debtors have the worst repayment capacity, an average 2.76 term debt coverage ratio, which is significantly less than the 7.07 ratio for non-recipients.

New and old FSA debtors have significantly lower average current ratios (2.2 and 3.9), indicating less liquidity than non-FSA farms (22.4). Old FSA borrowers are significantly less financially efficient than the new borrowers and their non-FSA counterparts as gauged by their mean asset turnover ratio, which measures the proportion of gross cash farm income generated per dollar of farm business assets. The new borrowers, on the other hand, are relatively less efficient than both the old and non-FSA borrowers in terms of operating expense ratio, which measures the proportion of gross cash farm income absorbed by cash operating expenses. In general, the non-recipients are significantly

stronger than old recipients and new recipients except for term debt coverage and asset turnover ratios.

Compared specifically with the non-recipients, the new FSA loan recipients have 26.4 percent more gross cash income (mainly coming from 36.7 percent higher crop income and 49.7 percent higher government payments) and 28.9 percent higher cash expenses (due mainly to 38.5 percent higher fixed expenses). These differences result in new FSA loan recipients having 13.5 percent more net cash farm income and 16.1 percent higher net farm income than non-FSA recipients, although they are not significantly different. While the new FSA borrowers have slightly higher (2.1 percent) assets, they also have accumulated significantly more (43.2 percent) liabilities, making their farm equity 16.1 percent lower than the non-recipients.

On average, FSA debtors tend to have more financial leverage (less solvency), less liquidity, lower repayment capacity, and slightly less efficiency than their non-FSA counterparts. Farmers having high leverage, low liquidity, and less repayment capacity are more likely to be denied credit from conventional sources and, therefore, need to rely on FSA assistance.

The comparative financial characteristics discussed above indicate that FSA borrowers are distinct from non-FSA but eligible recipients. FSA loan recipients are clearly much more in debt and, potentially, financially stressed. FSA recipients also have more gross cash income than non-FSA but eligible recipients on average, although not significantly more. Since our criteria for hobby farms are minimal, more demanding criteria would reduce the pool of eligible non-recipients even further.[28] If additional hobby farms were removed, the financial figures for the non-recipients would likely be greatly changed. Nonetheless, the data indicate that direct loans on average are supporting farms envisioned in the FSA definition of farms and are not going to hobby farms. Moreover, loans are typically not going to farms with strong financial characteristics on average.

New and old FSA loan recipients have few significant differences in financial characteristics. New FSA loan recipients have significantly more crop income, rent and lease payments, and current liabilities and a greater asset turnover ratio than FSA loan recipients via older loans. Although new recipients appear to have better repayment capacity than the old recipients as measured by the term debt coverage ratio, the difference is not statistically significant. Likewise, the differences in average solvency (measured by debt-to-asset-ratio), liquidity (measured by current ratio), and financial efficiency (measured by operating expense ratio) between the new and old loan recipients are not statistically significant.

1.4.2. Comparative Financial Characteristics of SDA and Non-SDA Farmers

Table 1.8 lists select financial characteristics of FSA eligible farms obtained from the ARMS data. Farms classed as 'SDA race' are all FSA eligible farms in the ARMS dataset, indicating operation by a farmer who is of a race or ethnicity outside of "White, not of Hispanic Origin." This sample includes all of the SDA race categories targeted by FSA. Farms classed as 'SDA gender' are all FSA eligible farms in the ARMS dataset, indicating operation by a farmer who is of the gender "Female" (regardless of race). Farms classed as 'non-SDA' are all FSA eligible farms in the ARMS dataset not fitting into either the SDA race or SDA gender classifications.[29]

[28] The $5,000 in gross farm income is minimal. Assuming that most of the $5,000 gets absorbed by expenses, a household relying on farming income is generating very little of its living expenses from the farm. Much larger sales would be needed to generate net income that would make up a substantial portion of household expenses.

[29] The analysis that follows would be more illuminating if we could have used new and old SDA borrowers. However, the number of SDA borrowers in the ARMS data is too low to allow for useful inference so we are forced to compare among FSA eligible groups.

In general, SDA race farms are similar to their non-SDA counterparts with respect to observed gross cash income, cash expenses, net cash farm income, net farm income as well as their farm assets, farm liabilities, and farm equity. Although there are no statistically significant differences for the mean values of these variables at the 5 percent level, SDA race mean values are lower by 11.3, 9.0, 22.6, 27.5, 18.0, and 18.4 percent, respectively, than non-SDA mean values. In addition, SDA farmer current ratio, term debt coverage ratio, asset turnover ratio and operating expense ratio, while 19.0 percent lower, 1.3 percent lower, 24.6 percent lower and 42 percent higher, respectively, are also not statistically different than those of the non-SDA farmers. The 37.6 percent difference in mean debt-to-asset ratios, however, is statistically significant at the 5 percent level. The debt-to-asset ratio for SDA race is 17.9 percent while that for non-SDA is 24.6 percent, making SDA race relatively more solvent. In fact, the only significant differences between SDA race and non-SDA eligible farmers besides debt-to-asset ratio are that SDA race farmers have lower government payments, insurance premiums, and depreciation expenses than non-SDA eligible farmers.

SDA gender farms, however, exhibit statistically significant differences in financial characteristics from both the non-SDA farms and SDA race farms that are especially apparent from the comparative income statement and balance sheet data in table 1.8. The SDA gender farms have approximately 40.0 and 45.7 percent of the gross cash income and expenses of non-SDA farms, while showing 22.4 percent of the net farm income of the non-SDA group. Although the size of their operations measured as by gross cash income is only 40.0 percent of non-SDA farms, they have 69.1 percent of the assets, 59.6 percent of the liabilities, and 71.2 percent of the equity of their non-SDA counterparts. The estimates also indicate that SDA gender farms exhibit significantly less financial leverage (higher solvency) as measured by the debt-to-asset ratio than non-SDA farms. Although the differences are not statistically significant at the 5 percent level, SDA gender farms also have relatively lower repayment capacity as measured by the term debt coverage ratio, better liquidity as measured by the current ratio, and less financial efficiency as measured by the asset turnover and operating expense ratios than non-SDA farms.

As observed earlier, the average OL loan principal for SDA farmers is considerably lower than that for non-SDA farmers. The somewhat smaller size as measured by the gross cash income of SDA farmers, particularly women, might account for this. The smaller size also suggests that SDA farmers may not be benefiting from economies of scale. However, FO loans did not show a similar disparity. This relative difference between OL and FO loan principal for SDA and non-SDA farms might have resulted from FO loan sizes being more homogenous since 70 percent of the funds have to be directed to beginning farmers.

In general, the income statement of SDA race farms is significantly superior, in absolute values and statistically, to that of the SDA gender farms. The SDA race farms' average gross cash income, cash expenses, net cash farm income, and net farm income are higher than those of the SDA gender farm by 55.5, 50.2, 81.2, and 71.4 percent, respectively. The balance sheet of the of SDA race farms also appears to be stronger, although not statistically significant at the 5 percent level. Farm equity is 15.7 percent higher, mainly because of 15.1 percent higher non-current assets. Likewise, the differences in the various financial ratios between SDA race and SDA gender are not statistically significant.

Financially, SDA race farmers appear to be similar to non-SDA farmers. However, two significant differences are government payments and debt-to-asset ratio, where SDA race farmers had less government payments and smaller debt-to-asset ratios than non-SDA farmers on average. These differences could be explained by the fact that SDA race borrowers tend to be concentrated regionally whereas non-SDA bor-

Table 1.8. Financial characteristics of FSA-eligible farms by SDA status, 2000–2003 average

Item	SDA status			t-values		
	SDA race (a)	SDA gender (b)	Non-SDA (c)	a-b	a-c	b-c
Number of farms	45,180	56,135	774,995			
Farm operation income statement						
Gross cash income	136,245	60,589	151,644	3.87*	-0.81	-8.82*
	(17,885)	(7,859)	(6,692)			
Livestock income	40,844	18,612	52,791	3.19*	-1.75	-7.56*
	(6,109)	(3,347)	(3,043)			
Crop income	71,394	27,150	64,770	3.43*	0.56	-5.66*
	(11,489)	(5,882)	(3,094)			
Government payments	6,887	4,045	12,746	2.47*	-6.99*	-10.42*
	(814)	(810)	(201)			
Other farm-related income	17,121	10,783	21,337	1.88	-1.28	-6.35*
	(3,126)	(1,285)	(1,055)			
Less: Cash expenses	112,811	56,189	122,925	2.78*	-0.51	-7.81*
	(19,161)	(6,888)	(5,057)			
Variable expenses	89,235	42,934	92,984	2.73*	-0.23	-7.00*
	(16,004)	(5,698)	(4,313)			
Fixed expenses	23,577	13,255	29,941	2.83*	-1.84	-10.17*
	(3,357)	(1,426)	(811)			
Real estate & property taxes	2,380	2,066	2,952	0.99	-1.84	-6.01*
	(297)	(115)	(93)			
Interest expenses	9,286	5,966	10,879	2.22*	-1.12	-6.05*
	(1,341)	(670)	(459)			
Insurance premium	2,855	1,973	4,218	1.91	-3.06*	-11.22*
	(432)	(167)	(111)			
Rent & lease payments	9,055	3,250	11,891	3.08*	-1.63	-10.37*
	(1,718)	(777)	(302)			
Net cash farm income	23,434	4,401	28,719	2.72*	-0.78	-7.50*
	(6,499)	(2,612)	(1,925)			
Less: Depreciation	10,503	7,943	15,265	1.26	-3.09*	-4.61*
	(1,411)	(1,462)	(623)			
Labor, non-cash benefits	303	228	364	0.52	-0.44	-2.10*
	(132)	(57)	(31)			
Plus: Value of inventory change	1,206	2,967	5,294	-0.48	-1.16	-1.67
	(3,457)	(1,217)	(680)			
Non-money income	4,776	6,120	5,348	-1.56	-0.82	1.45
	(686)	(523)	(104)			
Net farm income	18,610	5,317	23,733	1.59	-0.66	-4.64*
	(7,600)	(3,520)	(1,830)			

rowers are distributed much more uniformly across the nation. Types of agriculture vary regionally, and certain types of agriculture may not qualify for as many government payments and may require more solvency than other types of agriculture. SDA gender farms are significantly smaller in size, have less income, and have higher solvency than non-SDA farms.

1.4.3. Comparative Financial Characteristics of Beginning Farmers

Table 1.9 lists select financial characteristics of FSA eligible farms obtained from the ARMS data for comparing BF eligible and ineligible farmers.[30] The income statement and balance sheet variables of beginning farmers differ substantially and, for most variables, significantly from those of non-beginning

[30] Ideally, we would use ARMS data to examine the characteristics of farmers receiving BF loans instead of the broader grouping of "eligible" farmers. Unfortunately, the nature of the ARMS data does not permit such analysis. While ARMS does identify the source of funds, just knowing that a farm operator satisfies BF criteria and has an FSA loan does not mean the loan was obtained through the BF program although it is likely so.

Table 1.8. Continued.

Item	SDA status			t-values		
	SDA race (a)	SDA gender (b)	Non-SDA (c)	a-b	a-c	b-c
Farm operation balance sheet						
Farm assets	605,884	493,711	714,797	1.48	-1.49	-4.19*
	(64,419)	(39,718)	(34,798)			
Current assets	65,255	34,895	77,930	3.51*	-1.59	-8.55*
	(7,530)	(4,275)	(2,656)			
Non-current assets	540,630	458,816	636,867	1.17	-1.42	-3.61*
	(59,396)	(37,104)	(32,593)			
Farm liabilities	114,206	78,981	132,482	1.84	-1.11	-4.45*
	(15,714	(10,918)	(5,005)			
Current liabilities	36,175	19,529	40,788	2.42*	-0.78	-4.94*
	(5,621)	(3,941)	(1,729)			
Non-current liabilities	78,031	59,452	91,695	1.35	-1.18	-3.63*
	(11,036)	(8,176)	(3,453)			
Farm equity	491,678	414,730	582,315	1.25	-1.49	-3.79*
	(52,632)	(32,271)	(30,154)			
Current ratio	17.78	26.96	21.16	-1.44	-0.63	0.89
	(3.72)	(5.20)	(3.91)			
Debt-to-asset ratio (%)	17.89	16.90	24.61	0.38	-2.53*	-2.60*
	(1.57)	(2.06)	(2.14)			
Term debt coverage ratio	6.83	5.26	6.92	0.37	-0.46	-0.04
	(2.35)	(3.54)	(0.65			
Asset turnover ratio	0.40	0.44	0.50	-0.14	-0.50	-0.24
	(0.18)	(0.23)	(0.08)			
Operating expense ratio (%) **	82.80	92.74	81.06			

Source: Computed from ARMS data. The standard errors for the estimates (in parentheses) are computed using a jackknife procedure

*The t-values followed by asterisks indicate that the differences between the means are significant at the 5 percent level at 28 degrees of freedom and a critical t-value of 2.048 (two-tailed test).

** We used the ratio of the four-year mean cash expenses and gross cash income to compute this variable because the means of the ratios computed from individual ARMS observations gave extremely high, unrealistic values. Standard errors are not computed since it is not clear what the appropriate jackknife procedure would be.

farmers. As expected, beginning farms are much smaller in financial size than non-beginning farms by about $150,000 in mean gross cash income. In gross terms, OL eligible beginning farmers have 27.0 percent of the gross cash income and 29.8 percent of the cash expenses of the non-BF eligible farmers. Beginning OL farmers have only 15.7 percent of the net cash farm income and 23.4 percent of the net farm income of the non-BF eligible farms. Although BF OL operators are much smaller in terms of income, they do have 37.9 percent of the assets, 40.9 percent of the debt, and 37.3 percent of the equity of the non-BF eligible farms. The significantly lower asset, debt, equity, and income levels are clear indications that the BF farmers have the characteristics expected of less experienced farmers. It thus appears that the beginning farmer loans are targeted to those farmers who do not have a large asset base or income level that would be more able to command credit from conventional sources.

Overall, BF OL operators are in a significantly more liquid position than their non-BF counterparts based on higher mean current ratio. However, the differences in solvency (measured by debt-to-asset ratio), repayment capacity (measured by term debt coverage ratio), and financial efficiency (measured by asset turnover) are all statistically insignificant at the 5 per-

Table 1.9. Financial characteristics of FSA-eligible farms by beginning farm status, 2000–2003 average

Item	Beginning farm status			t-values		
	BF OL eligible (a)	BF FO eligible (b)	Non-BF eligible (c)	a-b	a-c	b-c
Number of farms	326,667	179,078	501,153			
Farm operation income statement						
Gross cash income	54,963	47,415	203,451	1.37	-18.64*	-20.51*
	(4,248)	(3,524)	(6,741)			
Livestock income	18,568	14,459	71,140	1.66	-13.86*	-14.73*
	(1,690)	(1,808)	(3,396)			
Crop income	24,082	23,397	86,211	0.20	-15.12*	-14.12*
	(2,100)	(2,704)	(3,533)			
Government payments	3,901	3,421	17,512	1.74	-42.74*	-40.02*
	(164)	(222)	(273)			
Other farm-related income	8,412	6,138	28,588	1.80	-12.81*	-18.18*
	(1,128)	(561)	(1,100)			
Less: Cash expenses	48,606	42,506	163,007	1.48	-18.51*	-19.91*
	(3,045)	(2,775)	(5,378)			
Variable expenses	36,388	31,982	123,508	1.26	-16.46*	-17.52*
	(2,544)	(2,400)	(4,640)			
Fixed expenses	12,218	10,524	39,499	2.03	-24.72*	-27.09*
	(620)	(557)	(913)			
Real estate & property taxes	1,405	1,026	3,851	4.29*	-19.81*	-23.77*
	(67)	(58)	(104)			
Interest expenses	4,991	3,246	14,098	3.48*	-14.12*	-17.40*
	(373)	(335)	(526)			
Insurance premium	1,570	1,368	5,682	2.12*	-26.40*	-26.84*
	(61)	(73)	(143)			
Rent & lease payments	4,252	4,883	15,868	-1.39	-24.82*	-19.75*
	(242)	(386)	(400)			
Net cash farm income	6,358	4,909	40,444	0.75	-14.11*	-14.97*
	(1,402)	(1,329)	(1,967)			
Less: Depreciation	6,782	4,976	19,923	2.33*	-15.12*	-23.73*
	(692)	(347)	(526)			
Labor, non-cash benefits	94	52	524	1.64	-10.36*	-11.73*
	(19)	(16)	(37)			
Plus: Value of inventory change	3,101	2,333	6,453	1.19	-3.40*	-3.94*
	(383)	(519)	(908)			
Non-money income	4,934	4,735	5,712	0.74	-3.57*	-4.32*
	(186)	(195)	(114)			
Net farm income	7,517	6,949	32,162	0.33	-10.03*	-10.58*
	(1,288)	(1,142)	(2,093)			

Table 1.9. Continued.

Item	Beginning farm status			t-values		
	BF OL eligible (a)	BF FO eligible (b)	Non-BF eligible (c)	a-b	a-c	b-c
Farm operation balance sheet						
Farm assets	350,617	221,017	924,362	2.55*	-10.41*	-29.85*
	(50,306)	(7,036)	(22,489)			
Current assets	26,919	22,779	106,198	1.60	-24.13*	-24.86*
	(1,767)	(1,893)	(2,770)			
Non-current assets	323,698	198,238	818,164	2.53*	-9.26*	-28.82*
	(49,270)	(6,162)	(20,608)			
Farm liabilities	68,666	43,667	167,875	4.72*	-13.31*	-19.45*
	(4,628)	(2,578)	(5,842)			
Current liabilities	17,258	12,886	53,689	2.53*	-15.85*	-17.51*
	(1,189)	(1,250)	(1,967)			
Non-current liabilities	51,408	30,780	114,187	4.84*	-11.09*	-18.04*
	(3,797)	(1,935)	(4,198)			
Farm equity	281,951	177,350	756,487	2.15*	-9.25*	-29.93*
	(48,077)	(7,274)	(17,929)			
Current ratio	34.54	27.48	13.36	0.73	2.80*	2.03
	(7.15)	(6.49)	(2.47)			
Debt-to-asset ratio (%)	28.59	30.88	21.22	-0.21	1.39	1.03
	(5.24)	(9.38)	(0.73)			
Term debt coverage ratio	5.90	8.03	7.24	-0.37	0.46	0.15
	(2.69)	(5.14)	(1.16)			
Asset turnover ratio	0.65	0.76	0.39	-0.34	1.21	1.25
	(0.19)	(0.29)	(0.09)			
Operating expense ratio (%)**	88.43	89.65	80.12			

Source: Computed from ARMS data. The standard errors for the estimates (in parentheses) are computed using a jackknife procedure

*The t-values followed by asterisks indicate that the differences between the means are significant at the 5 percent level at 28 degrees of freedom and a critical t-value of 2.048 (two-tailed test).

** We used the ratio of the four-year mean cash expenses and gross cash income to compute this variable because the means of the ratios computed from individual ARMS observations gave extremely high, unrealistic values. Standard errors are not computed since it is not clear what the appropriate jackknife procedure would be.

cent level. Nonetheless, the differences in these ratios, except for asset turnover, point toward the BF eligible farmers being in financially weaker positions, as we would expect.

Farmers meeting the more restrictive BF FO eligible definition appear to have slightly lower average gross cash income, cash expenses, net cash farm income, and net farm income than their BF OL eligible counterparts, but the differences are not statistically significant. Interestingly, the farm assets, farm liabilities, and farm equity of BF FO eligible farmers are about $130 thousand, $25 thousand, and $105 thousand less, respectively, than those of the BF OL eligible farmers. These differences are all statistically significant.

Differences in financial ratios between BF FO and BF OL farmers are not statistically significant at the 5 percent level. However, the mean current ratio for FO eligible BF farmers is lower than the corresponding ratio for OL eligible BF farmers but higher than that of the non-BF eligible farmers. The BF OL eligible farmers have a lower average term debt coverage ratio at 5.9 compared to FO eligible (8.0) and non-BF eligible (7.2) farmers, indicating less repayment capacity, although the difference is statistically insignificant. Finally, although the difference is not statistically significant, both the BF OL and FO eligible farmers appear to be more financially efficient than non-BF farmers as indicated by the relatively higher asset turnover ratios. However, the reverse is true in terms of operating expense ratio, i.e., both the BF OL and FO eligible farmers appear to be spending more on their farm operations relative to their gross cash income, as indicated by their higher operating expense ratios, than non-BF farmers.

The differences in income statement and balance sheet variable means indicate that the BF program is targeted to a class of farmers distinctly different from those farmers who are FSA eligible but who do not qualify as beginning farmers. Given the recent focus of FSA on beginning farmers, it appears that the emphasis on this group can be justified in terms of helping financially limited farmers. While their debt positions in terms of debt-to-asset ratios are not dire, these are farms that are typically not producing levels of income sufficient to support a family. The average net farm income of BF eligible farmers is $7,316 dollars, which is less than half of the U.S. federal poverty threshold for 2003 of $15,260 for a family with three members (U.S. Department of Health and Human Services, 2003), such that off-farm income is necessary. With such meager farm income, these operators are likely to be turned down for conventional loans elsewhere.

1.4.4. Comparative Financial Ratios among FSA Direct Loan Borrower Groups

The information for this section was obtained from a combination of the national New Loan (NL) database which is described earlier in section 1.1.3 and the Farm and Home Plan (FHP) database from FY 2000–2003. There were 70,923 new loans originated and 54,984 borrowers in the original NL database. After excluding Youth and non-program loans, 60,151 direct loans remained. Seventy-nine percent were OL, 10.2 percent were FO, and 10.8 percent were EM loans. These loans went to 45,016 borrowers, each one of whom had at least one loan of any type. These 45,016 borrowers are unique within year but not unique across all four years. A borrower who received at least one FSA Direct Loan in each of the four fiscal years would be counted four times. Each borrower is counted only once in one year even if the borrower receives multiple types of loan in the same fiscal year. Allowing for double counting of borrowers with more than one type of loan, the number of borrowers by loan type is 49,814 consisting of 75.7 percent OL, 12.2 percent FO, and 12.1 percent EM recipients. Borrowers of FSA loans are required to fill out a Farm and Home Plan (FHP) each year. Financial information from the FHP was matched for

19,153 FSA borrowers during the study period, FY 2000–2003. This represents 42.5 percent of the total number of borrowers in the final NL file.[31] A full description of the matching process is presented in appendix 1.C.

The financial ratios used in this section's analyses were obtained from this final data set that contains a subset of FSA borrowers originating loans from the period FY 2000–2003. This is a group of unique (*within* year) FSA borrowers originating new loans who had completed FHPs. It would have been desirable to have a completed current plan for each new loan. Most likely, such plans were made but were not input into the national, electronic database. It was FSA practice to have these plans completed and stored either at the county or the regional office. During the FY 2000–2003 period it was not required that all plans be entered into the electronic database. FSA has a plan to have all Farm Business Plans, which have replaced the FHPs, entered into an electronic database that will make future analyses like these more comprehensive. It should also be noted that multiple loans could be based on one plan. If a borrower received a new loan in a current year based on a plan from more than a year earlier, our method would not identify such a plan as a valid, current plan.

Before analyzing the financial data, it is useful to analyze the observations available to see how representative they are of the full population of FY 2000–2003 originators. This is necessary if we are to use the financial characteristics of these borrowers as reliable indicators of the financial characteristics of the population. So, we consider the distribution of loan types by assistance codes.

As we would expect, most of the borrowers received OL loans. Of the 19,153 borrowers, 16,674 received at least one OL loan. Correspondingly, 1,946 borrowers received at least one FO loan and 2,616 borrowers received at least one EM loan. The total number of borrowers by loan type is 21,236 which exceeds the count of unique borrowers by 2,038 because of double counting, i.e., some borrowers had more than one type of loan, hence were counted more than once.

The proportions of borrowers with at least one type of loan show that OL borrowers comprised the bulk of total FSA borrowers with new loans. Some 78.5 percent of the 21,236 borrowers had at least one OL loan. FO and EM borrowers accounted for 9.2 percent and 12.3 percent, respectively. These proportions compare well with the distribution of total loans given during the same period (79.0, 10.2, and 10.8 percent, respectively) indicating that the final sample of borrowers with matched plans is a fairly good representation of the total borrower population.

Among the OL borrowers, 53.9 percent had regular loans, 32.0 percent had beginning farmer loans, 8.2 percent had SDA loans, and 5.9 percent had beginning farmer SDA loans.[32] This distribution closely resembles that of the total OL loans given (51.0, 35.3, 7.3, and 6.4 percent, respectively) during the same period.

The FO borrowers were mostly beginning farmers (52.6 percent) or regular loans (25.7 percent), with the rest accounted for by BF/SDA ethnic (7.7 percent), SDA ethnic (6.2 percent), BF/SDA gender (4.7 percent), and SDA gender borrowers (3.1 percent). For the most part, this distribution compares well

[31] Since 42.5 percent of the population is represented in the sample and the sample is not random, no statistical inference is used in making comparisons. Ideally, the sample would include the entire population. It does not, and the reasons why are not sufficiently known to the extent that the resulting sample could be represented to be random. However, we suspect the 42.5 percent is representative of the population. And these data are by far the most comprehensive extant. Therefore the following analysis is the best available and should be used for assessing borrower characteristics. When more comprehensive data become available in future years, the analysis here should be superseded by analysis of those data.

[32] These are the classifications when the loans are sorted by assistance type. It should be remembered that SDA or BF eligible applicants can also get loans in other assistance types.

with that of the total FO loans given during the same period (57.0, 25.1, 5.8, 4.4, 4.8 and 2.9 percent, respectively), indicating good representation.

Table 1.10 shows that the median debt-to-asset-ratio for the unique 19,153 FSA borrowers was 0.68.[33] Because OL borrowers make up a large majority of borrowers, the OL borrowers had a median debt-to-asset ratio identical to the overall value of 0.68. The FO borrowers had a lower median debt-to-asset ratio at 0.63, indicating that they were relatively more solvent than the OL borrowers. The EM borrowers, on the other hand, were the least solvent, as indicated by the highest median debt-to-asset ratio of 0.74. This is not surprising since EM borrowers would not be getting emergency loans unless they had recently

Table 1.10. FSA borrower median financial ratios by assistance-type class, FY 2000–2003

Assistance-type class	N	Debt-to-asset ratio median	Current ratio median	Return on assets median	Repayment ability median
All loans	19,153	0.68	0.71	0.03	1.03
All OL	16,674	0.68	0.70	0.03	1.03
All FO	1,946	0.63	1.11	0.00	1.06
FO regular	501	0.61	1.05	0.03	1.04
FO BF	1,024	0.64	1.24	0.00	1.06
FO BF SDA ethnic	149	0.67	0.77	0.00	1.09
FO BF SDA gender	92	0.73	0.66	0.00	1.07
FO SDA gender	60	0.49	1.12	0.00	1.06
FO SDA ethnic	121	0.54	0.84	0.00	1.06
OL regular	9,034	0.64	0.70	0.03	1.02
OL BF	5,365	0.75	0.77	0.04	1.04
OL SDA	1,371	0.61	0.57	0.01	1.04
OL BF SDA	993	0.79	0.45	0.00	1.04
EM	2,616	0.74	0.40	0.06	1.02
BF	7,177	0.74	0.80	0.03	1.04
Non-BF	11,976	0.64	0.67	0.03	1.03

Source: Computed from combined and matched New Loan and Farm and Home Plan datasets.

[33] Medians are used instead of means because of the skewness of the distributions and data errors even though extreme observations were removed as part of data cleaning. The means are presented in appendix 1.D. We essentially treat the statistics from the FHP data as population parameters. Since the sample contains 42.5 percent of the observations on the population, the need for inference is certainly valid. However, even though the sample seems to be representative, it can hardly be called random and the sampling distributions of the medians would be hard to characterize. For most of the comparisons the sample sizes are large in proportion to the population so that most differences in statistics are likely true differences. However, the reader is warned that differences among statistics might be due to sampling error instead of actual population differences.

experienced adverse events driving them into financial stress. These levels of solvency ratios are substantially higher than the national average debt-to-asset ratio[34] for all farm businesses of just under 0.15 during the same four-year period as published by USDA-ERS in their website.[35]

The FSA borrowers had a median current ratio of 0.71, which means borrowers had 71 cents of current assets for every dollar of current liability. The FO borrowers, with a median current ratio of 1.11, were markedly more liquid than the OL borrowers who had a median current ratio of 0.70. The EM borrowers were the least liquid with a median current ratio of 0.40. The emergency circumstances of the EM borrowers explain their lower current ratio compared with the recipients of the other two loan programs. The difference between OL and FO borrowers could be explained by the fact that FO borrowers, who are mostly beginning farmers, are typically substantially younger than the typical OL borrower and therefore have not had the time to acquire as much current debt. In terms of median repayment ability, the FO borrowers were again in relatively better shape (1.06) than the OL borrowers (1.03) and the EM borrowers (1.02). All FSA borrowers had a median repayment value of 1.03. The rate of return on assets indicated that EM borrowers planned to be more profitable followed by OL borrowers and finally FO borrowers. All FSA borrowers had a median planned rate of profitability of 0.03.

This median rate of return on assets is slightly higher than the national average rate of return on assets from current income[36] for all farm businesses of just under 0.02 during the same four-year period as published by USDA-ERS in their website.[37]

Based on the four financial measures used, except for rate of return on assets, the FO borrowers appeared to have an overall stronger financial condition than the OL and EM borrowers. This was intuitively expected considering the relatively longer term nature of the FO loans, which should normally require more stringent loan eligibility requirements. But it probably also reflects the borrower ages and length of time in business.

The median debt-to-asset ratio was 0.68. Among the assistance type groups, the FO SDA gender group had the lowest median debt-to-asset ratio at 0.49, which was equivalent to having the best solvency. The OL BF SDA group had the highest value at 0.79 (or least solvent). The remaining groups had the following median debt-to-asset ratios, in ascending order (or decreasing solvency): FO SDA ethnic (0.54), FO regular and OL SDA (0.61), FO BF and OL regular (0.64), FO BF SDA ethnic (0.67), FO BF SDA gender (0.73), and OL BF (0.75). As a group, all beginning farmers were relatively less solvent (0.74) than non-beginning farmers (0.64).

The FO BF group had the highest median current ratio at 1.24 (most liquid) and the OL BF SDA group had the lowest value at 0.45 (least liquid). The median current ratio for all borrowers was 0.71. The median current ratios for the other groups, in descending order (or decreasing liquidity), were: 1.12 for FO SDA gender, 1.05 for FO regular, 0.84 for FO SDA ethnic, 0.77 for OL BF and FO BF SDA ethnic, 0.70 for OL regular, 0.66 for FO BF SDA gender, and 0.57 for OL SDA. Beginning farmers were more

[34] The national debt-to-asset ratios only include farm debts and farm assets as opposed to total farm and non-farm debts and assets in the FHP.
[35] Reference: http://www.ers.usda.gov/Data/FarmBalanceSheet/FBSDMU.HTM. Accessed May 17, 2005.
[36] The denominator of the national return on asset ratio only includes farm assets as opposed to total farm and non-farm assets for the FHP ratio. Also, the national return on asset ratio adds interest and subtracts a charge for unpaid operators' labor and management from net farm income in the numerator, whereas the FHP ratio only subtracts family living expense from net farm income.
[37] Reference: http://www.ers.usda.gov/Data/FarmBalanceSheet/FBSDMU.HTM. Accessed May 17, 2005.

liquid (0.74) than non-beginning farmers (0.67). OL BF borrowers have the highest planned rate of return on assets at 0.04; followed by OL regular, FO regular, beginning, and non-beginning farmers at 0.03; and OL SDA at 0.01. The remaining groups showed planned profitability rates of 0.00.

The median repayment ability for all observations was 1.03. By group, FO BF SDA ethnic had the highest median repayment ability at 1.09 and OL regular had the lowest at 1.02. FO BF SDA gender had 1.07; while the three groups (FO BF, FO SDA gender, and FO SDA ethnic) had the same median repayment ability of 1.06; and all the remaining types (FO regular, OL BF, OL SDA and OL BF SDA) had 1.04. Beginning farmers had slightly higher repayment ability at 1.04, compared to non-beginning farmers' 1.03. Before comparing financial ratios among various demographic classes, we consider how representative the matched FHP and NL data are of all FSA borrowers originating loans during FY 2000-2003. White, non-Hispanic males comprised the bulk (79.6 percent) of the FSA borrowers with matched plans, followed by white, non-Hispanic females (4.5 percent), Black/African Americans (3.8 percent), American Indian/Alaskan native (2.7 percent), Hispanic/Latino (2.7 percent) and Asian/Pacific Islander/Hawaiian native (0.7 percent) (table 1.11). The remaining borrowers (6.3 percent) were either multiple race or unknown race. This sample distribution compares well with that of the total population of FY 2000–2003 borrowers (80.4, 5.0, 3.1, 2.3, 2.5, 0.6, and 6.1 percent, respectively), indicating that the sample represents the population well.

Asian/Pacific Islander/Hawaiian native and Hispanic/Latino groups had the highest solvency, with median debt-to-asset ratios of 0.57 and 0.58, respectively. They were followed by white, non-Hispanic female (0.63), white, non-Hispanic male (0.68), American Indian/Alaskan natives (0.71), and Black/African Americans (0.79).

Table 1.11. FSA borrower median financial ratios by demographic class, 2000–2003

Demographic class	N	Debt-to-asset ratio median	Current ratio median	Return on assets median	Repayment ability median
American Indian/AK Native	513	0.71	0.59	0.00	1.05
Asian/Pacific Is/ HI Native	128	0.57	1.01	0.03	1.09
Black/African American	733	0.79	0.27	0.00	1.03
Hispanic/Latino	467	0.58	0.65	0.04	1.04
White, non-Hispanic male	15,242	0.68	0.74	0.03	1.03
White, non-Hispanic female	865	0.63	0.61	0.00	1.04
Others/multiple race	443	0.64	0.62	0.03	1.04
SDA gender	1,007	0.63	0.61	0.00	1.04
SDA race	1,810	0.70	0.49	0.01	1.04
SDA All	2,664	0.67	0.53	0.01	1.04
Non-SDA	16,489	0.68	0.73	0.03	1.03

Source: Computed from combined and matched New Loan and Farm & Home Plan data sets.

The Asian/Pacific Islander/Hawaiian native group also had the most liquid operations, with a median current ratio of 1.01, followed by white non-Hispanic males (0.74), Hispanic/Latinos (0.65), white non-Hispanic female (0.61), American Indian/Alaskan native (0.59), and Black/African American (0.27).

The Hispanic/Latino group showed the highest planned rate of return on assets at 0.04, followed by Asian/Pacific Islander/Hawaiian native and white non-Hispanic male at 0.03. Non-SDA borrowers as a whole had a higher planned profitability rate than the SDA borrowers.

The highest median ability to pay was exhibited by the Asian/Pacific Islander/Hawaiian native at 1.09, followed by American Indian/Alaskan native (1.05). Both Hispanic/Latinos and white non-Hispanic females had 1.04; and both white non-Hispanic males and Black/African Americans had 1.03.

In general, Asian/Pacific Islander/Hawaiian native and Hispanic/Latino borrowers had stronger financial characteristics of solvency, liquidity, profitability, and repayment ability when measured at their medians. Conversely, American Indian/Alaskan native borrowers had weaker financial characteristics except for their repayment ability, which was the second best.

1.5. Alternative Creditworthiness Standards for FSA Borrowers

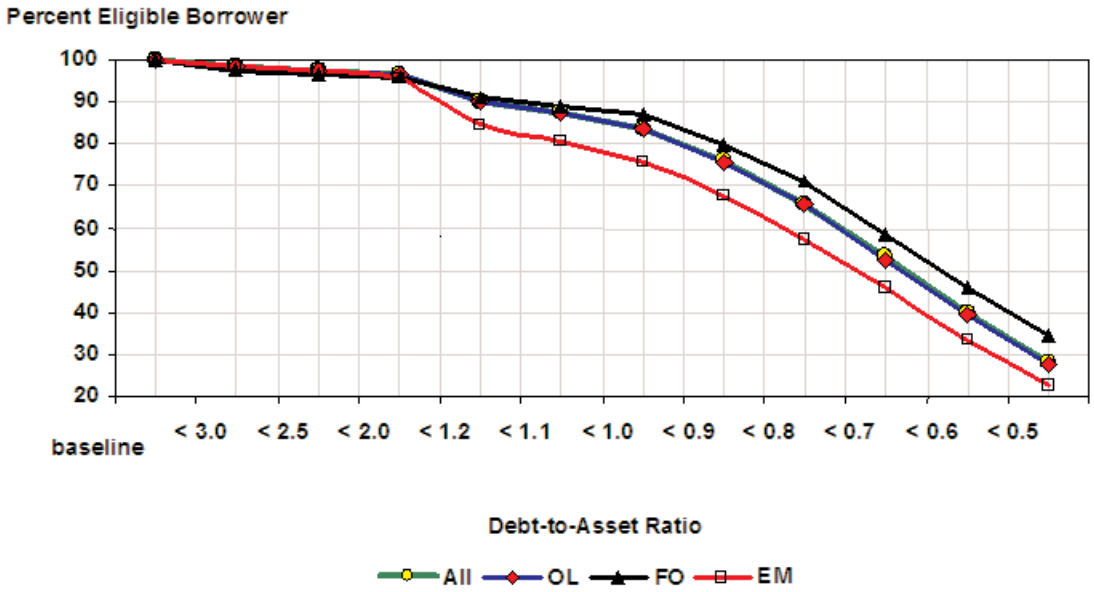
The impacts of alternative credit standards on the OL, FO, and EM Direct Farm Loan Programs are investigated in this section using the FHP sample of farmers discussed in section 1.4.4. The financial characteristics of farmers who received FSA loans during 2000 through 2003 are used to estimate the percentage of borrowers who would not have received FSA loans had more stringent credit standards been in place. The alternative creditworthiness standards used in this section are varying levels of solvency and repayment capacity. Currently FSA does not have a maximum level for the debt-to-asset ratio. The analysis in this section reveals what would happen if such a maximum were utilized.

1.5.1. Using Solvency as a Creditworthiness Standard

The debt-to-asset ratio measures the amount of debt relative to assets and is a measure of solvency. Increasing the stringency of a solvency standard for loan eligibility implies that a potential borrower would be required to have a debt-to-asset ratio below some maximum. Figure 1.38 shows how the percent of eligible borrowers would vary hypothetically for actual FY 2000–2003 borrowers who received new loans as the maximum debt-to-asset cut-off value is decreased. This implies the credit standard for eligibility becomes stricter. The higher line represents FO borrowers indicating that they are in relatively stronger financial condition and relatively less vulnerable to changes in the debt-to-asset creditworthiness standard than OL borrowers (middle line) and EM borrowers (lower line). It is not surprising that the OL line is similar to the "All" line as borrowers with OL loans comprise 78.5 percent of all borrowers with any type of direct farm loan program loan.

Ninety-eight percent of all the actual FSA borrowers would have been eligible had a maximum debt-to-asset ratio of less than 2.5 been used. However, using a debt-to-asset ratio cut-off standard of less than 1.0, only 84 percent of actual FSA borrowers would have received loans, leaving 16 percent as ineligible. With a credit standard of a debt-to-asset ratio less than 0.9, 76 percent of actual FSA borrowers would have been eligible; at less than 0.7, about half (53 percent) would have been eligible; and at less than 0.5, only 28 percent would have been eligible for FSA loans. Another implication of this distribution is that FSA Direct Loans are going to a financially distressed segment of the population not likely to be served by conventional credit sources.

For debt-to-asset ratio maximum levels below 1.2, a greater percentage of EM borrowers are likely to be



Source: Computed from Combined New Loan–Farm and Home Plan Database

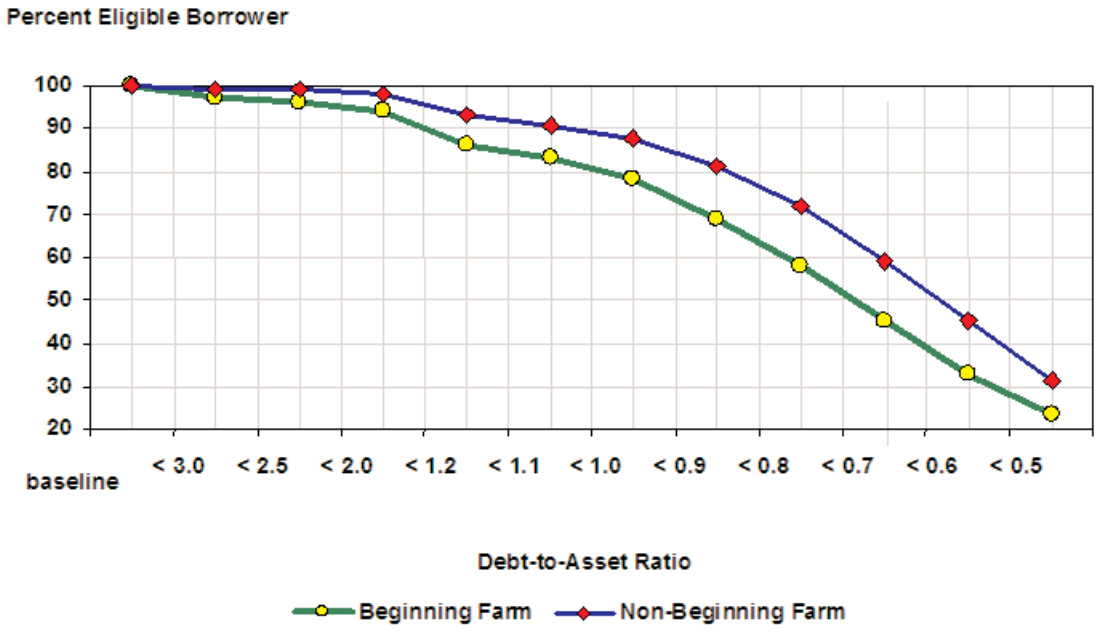
Fig. 1.38. Change in percent eligible borrowers using debt-to-asset ratio as a creditworthiness standard, by loan type, FY 2000–2003

ineligible than both OL and FO borrowers. However, comparing debt-to-asset ratios of EM borrowers with those of FO and OL borrowers may not be a fair comparison. The EM borrowers, by definition, have recently experienced a financial emergency and thus are in a precarious position. This emergency manifests itself in additional debt since the borrower is seeking credit to restore a disastrous situation and thus higher debt-to-asset ratios are to be expected. Also, the emergency precipitating the EM loan undoubtedly diminished the value of farm assets.

The impact of a more stringent solvency standard can also be explored with respect to beginning and SDA farmers. Figure 1.39 shows the impacts of increasing solvency standards on beginning farmers compared with non-beginning (regular) OL and FO farmers. We see that the non-beginning farmers are less impacted (higher line) than the beginning farmers, indicating that the non-beginning farmers have overall greater solvency. This is expected because beginning farmers have not had the time to accumulate more assets (the denominator of the solvency ratio) and benefit from potential asset appreciation as do non-beginning farmers.

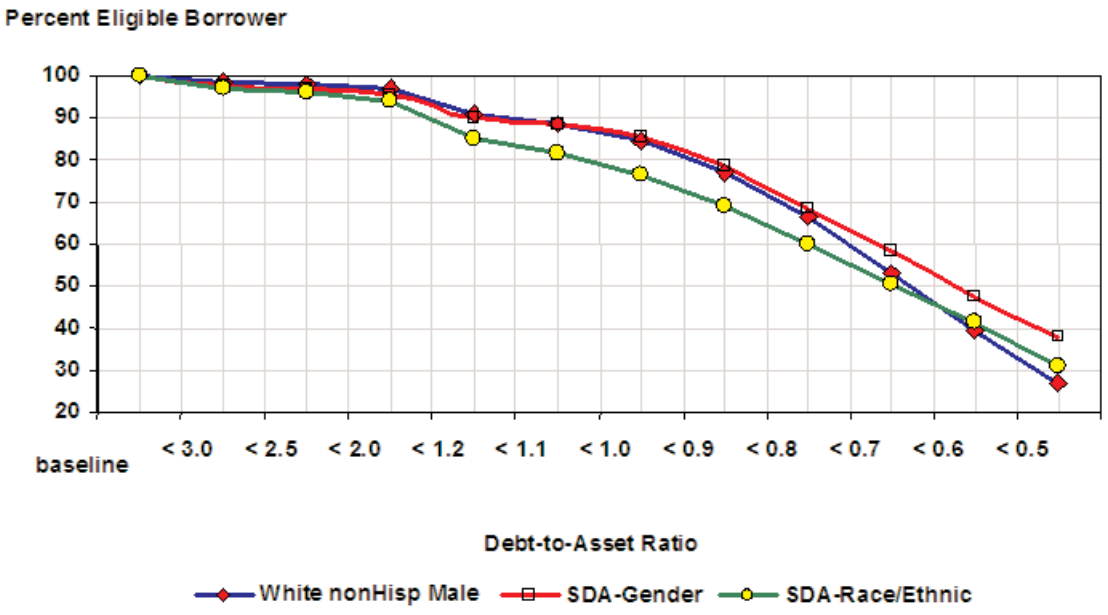
The effects of greater solvency requirements on OL and FO SDA farmers relative to the non-SDA farmers are apparent in Figure 1.40. The SDA gender line is generally higher, which shows that female borrowers are relatively less vulnerable to changes in solvency standard than the SDA race/ethnic and white, non-Hispanic males. For the most part, the SDA race/ethnic line is lower, which indicates that racial minorities are the most vulnerable to changes in the solvency standard.

The white, non-Hispanic male line, which represents the non-SDA group, lies close to that of the SDA gender up until a debt-to-asset ratio of less than 0.8, but begins to be more sharply affected than both the SDA groups as the solvency standard becomes stricter. These results indicate that, depending on the range of values, enforcing a greater solvency standard



Source: Computed from Combined New Loan–Farm and Home Plan Database

Fig. 1.39. Change in percent eligible borrowers using debt-to-asset ratio as a creditworthiness standard, by beginning farmer status, FY 2000–2003



Source: Computed from Combined New Loan–Farm and Home Plan Database

Fig. 1.40. Change in percent eligible borrowers using debt-to-asset ratio as a creditworthiness standard, by SDA group, FY 2000–2003

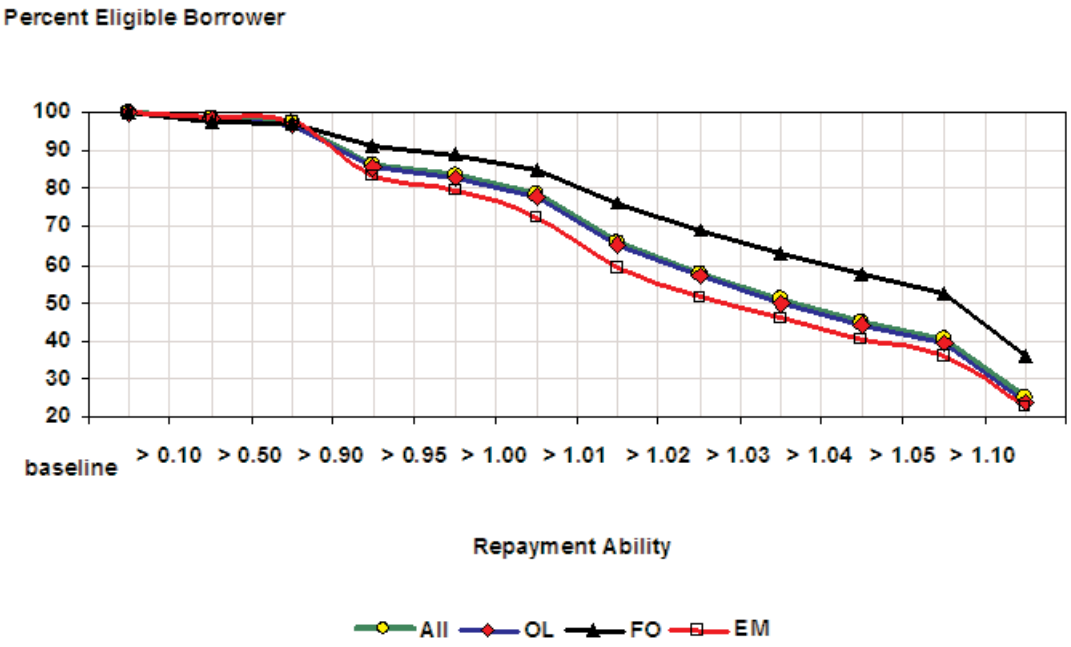
would have varying levels of impact on SDA and non-SDA farmers.

1.5.2. Using Repayment Capacity as a Creditworthiness Standard

Repayment capacity is computed by dividing the balance available to service payments by the amount of payments due in the current year. This indicates the capacity of the borrower to repay both principal and interest with cash generated from the operations and other sources. A more stringent repayment capacity standard for loan eligibility means that a potential borrower would be required to have a higher repayment capacity ratio.

Figure 1.41 shows the change in the percent of eligible borrowers among actual borrowers who received new loans as repayment capacity cut-off values are increased, which has the effect of making the credit eligibility standard more stringent. The higher line represents FO borrowers, indicating that they are relatively financially stronger. Accordingly, FO borrowers would be relatively less affected than OL borrowers (middle line) and EM borrowers (lower line) by changes in the repayment capacity standard for eligibility. Again, the OL line is similar to the "All" line because it represents the vast majority of borrowers.

A cut-off of repayment capacity greater than 0.10 leaves 98 percent of actual FSA borrowers receiving new loans as eligible, while a cut-off greater than 0.90 reduces the eligible borrowers to 86 percent of current borrowers. A cut-off of greater than 1.00 further reduces the eligible borrowers to 78 percent. This indicates that 22 percent of actual borrowers are projected to be unable to make payments to their creditors as originally agreed. The percent of eligible borrowers declines to 51 when the repayment capacity



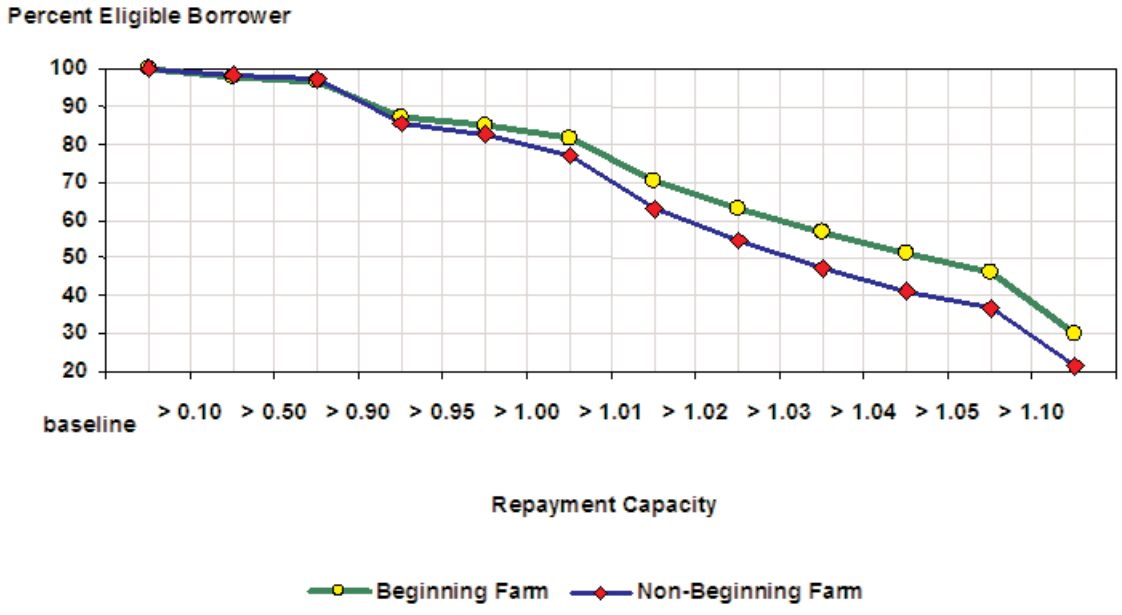
Source: Computed from Combined New Loan–Farm and Home Plan Database

Figure 1.41. Change in percent eligible borrowers using repayment capacity as a creditworthiness standard, by loan type, FY 2000–2003

standard exceeds 1.03. When the standard requires more than 1.10, only one-fourth of the actual borrowers remain eligible. While it might seem that more borrowers should exceed the 1.10 standard, the sub-population of borrowers being analyzed are those that have not been able to obtain funds from conventional creditors. Thus it is to be expected that most of the borrowers can barely make loan payments.

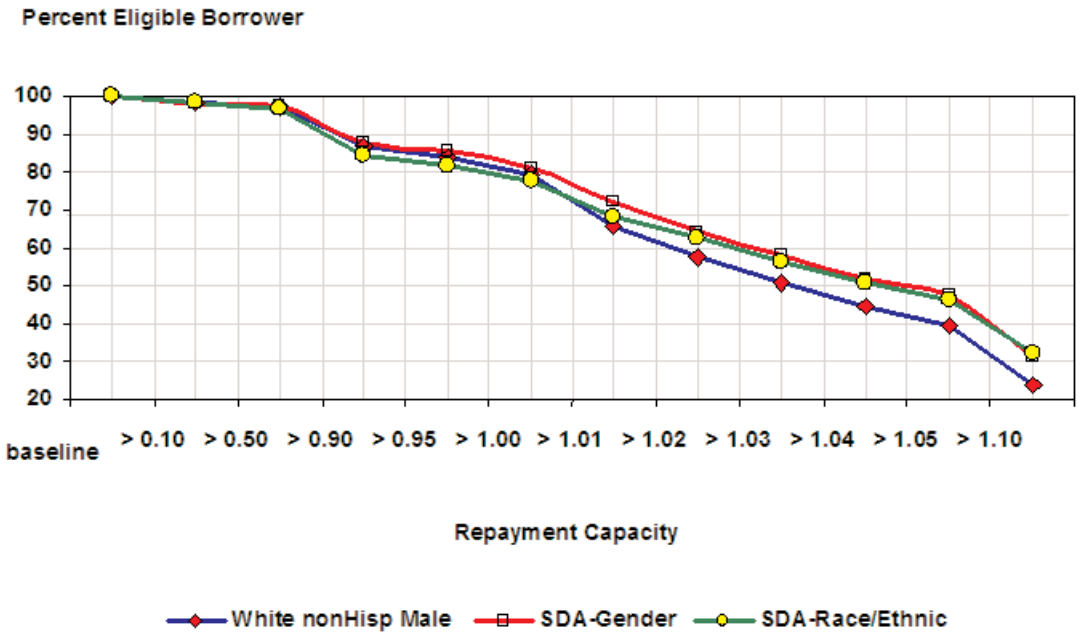
The impacts of a stricter standard for repayment capacity for OL and FO beginning and non-beginning (regular) farmers are shown in figure 1.42. In stark contrast with the results of using solvency as the standard, beginning farmers show less vulnerability (higher line) than the regular farmers when repayment capacity is used as the creditworthiness standard. A possible reason could be that beginning farmers have had relatively less exposure to the risks and uncertainties associated with long-term agricultural production that affect income and ability to pay. Another possible reason could be that beginning farmers and Farm Loan Managers are overly optimistic when planning income and expenses since there is little historical information on the beginning farm business relative to the non-beginning farm business on which to base their plans.

The relative effects of stricter repayment capacity requirements on SDA and non-SDA farmers are shown in figure 1.43. The SDA gender line is slightly higher but very close to that of the SDA race/ethnic line, which indicates that both SDA groups have comparable vulnerability to changes in repayment capacity standard. The non-SDA group (white, non-Hispanic male), on the other hand, shows comparable vulnerability with the SDA groups at less strict repayment capacity standards (greater than 1.0 and below) but shows a marked increase in vulnerability at higher (stricter) standard values (greater than 1.01 through greater than 1.10). A similar impact is observed in figure 1.40 when the solvency standard is used.



Source: Computed from Combined New Loan–Farm and Home Plan Database

Figure 1.42. Change in percent eligible borrowers using repayment capacity as a creditworthiness standard, by beginning farmer status, FY 2000–2003



Source: Computed from Combined New Loan–Farm and Home Plan Database

Figure 1.43. Change in percent eligible borrowers using repayment capacity as a creditworthiness standard, by SDA group, FY 2000–2003

1.5.3. Impact of Using a Stricter Creditworthiness Standard

The analysis above shows that for the most part, FSA serves borrowers with marginal financial strength or creditworthiness. For example, a seemingly practical creditworthiness standard of a debt-to-asset ratio less than 1.0 results in 16 percent of actual borrowers becoming ineligible for any FSA loan. For the beginning farmers, 22 percent of them would be hypothetically ineligible for OL and FO loans at this creditworthiness standard. In addition, 14 percent and 23 percent of SDA gender and SDA race/ethnic actual borrowers, respectively, would be ineligible if a less than 1.0 debt-to-asset standard ratio was imposed.

Likewise, a practical creditworthiness standard of a repayment capacity ratio over 1.0 renders 22 percent of the actual borrowers receiving new loans as ineligible for any FSA loan. By group, 19 percent, 19 percent, and 22 percent of beginning farmer, SDA gender, and SDA race/ethnic borrowers, respectively, would be ineligible for OL and FO loans if this repayment capacity standard was imposed.

Seventy-eight percent of all actual borrowers receiving new loans are projected to barely be able to pay their annual principal and interest obligations. These are the borrowers with repayment capacity greater than 1.00. Only 25 percent of all borrowers are in a position to withstand a 10 percent drop in repayment capacity and still pay their principal and interest obligations for the year. These are the borrowers with a repayment capacity ratio of 1.10 or more.

However, the analysis in this section assumes that Farm and Home Plans would not change if alternative credit standards were adopted. In actuality, loan applicants and lenders have some discretion in completing Farm and Home Plans. The resulting credit criteria such as debt-to-asset and repayment capacity ratios might change if there were specific standards that loan applicants had to strictly meet. The repay-

ment capacity ratio could be particularly sensitive to adjustments by the loan applicant since it is based on forecasted prices, production, expenses, etc. In contrast, the values of debts and assets used in computing the debt-to-asset ratio, particularly debts, are more easily verified. Thus, promulgating different creditworthiness standards might not have the impact on the FSA Direct Loan Program that would be expected from the graphs above because reported financial measures might adjust to the new standards.

1.6 Summary

The Farm Service Agency's Direct Farm Loan programs are designed to provide credit to farm borrowers unable to obtain credit from conventional sources at reasonable rates and terms. By setting eligibility guidelines at levels that screen out corporate and hobby type farms, federal legislation attempts to channel FSA program funds for use by family farms. In addition, a portion of direct loan allocations are specifically reserved for socially disadvantaged and beginning farmer applicants.

By most measures, FSA targeting of family farms appears successful. A majority (78–92 percent) of new FSA Direct Loan assistance in FY 2000–2003 was received by small family farms where "small" refers to farms with less than $250,000 in sales. Loan lending caps and the FSA criteria for family farms are assumed to be the primary mechanisms that exclude larger, financially stressed borrowers. In general, FSA borrowers are in a weaker financial position than non-FSA borrower farms by virtue of much higher debt-to-asset ratios and lower current ratios. FSA borrowers have higher mean income than the non-FSA recipients, but the difference is not statistically significant. FSA recipients have significantly higher government payments, fixed expenses and liabilities relative to non-FSA recipients. The mean farm equity of loan recipients is lower than that of the non-recipients and the difference between old recipients and non-recipients is statistically significant. Farm assets are not statistically different between FSA recipients and non-FSA recipients.

The 50-state average penetration rates for all loans combined (OL, FO, and EM) is 3.66 percent where penetration is the percentage of unique borrowers originating a new loan during FY 2000–2003 as distinct from the set of all eligible farmers. Penetration rates measured at the state level run from 0.44 percent to 21.48 percent with the bulk of the states having rates less than 8.00 percent. This level of penetration may seem low at first glance. However, the ARMS data indicate that about five times as many farmers hold FSA loans in a given year compared with only those obtaining new loans. Thus a higher percentage (the initial percentage plus four times the initial percentage) of farmers are FSA loan recipients than are indicated by the penetration ratios. Given that FSA provides less than 4 percent of the agricultural credit in the United States and FSA credit tends to be targeted to smaller family farms, it should not be surprising that over 18 percent of indebted non-hobby farmers and beginning farmers use FSA loans. Given that these recipients are typically financially stressed, FSA activities are servicing appropriate clientele.

FSA targeting of SDA borrowers has almost surely resulted in this group as a whole obtaining more credit than they would otherwise likely have obtained from FSA without targeting. National penetration of all direct loans (OL, FO, and EM loans) into the family farm market is 3.66 percent while the same figure for the SDA market is 4.62 percent. Despite the seemingly low penetration figures, 13.66 percent of FSA OL and FO borrowers are SDAs. SDA borrowers represent 13.45 percent of the total OL borrowers and 17.85 percent of the total FO borrowers. Recall that 35 percent and 70 percent of OL and FO allocations are targeted to beginning farmers, thus restricting the allocations available to non-BF including those SDAs who also are not beginning farmers.

SDA farmers tend to be geographically concentrated in specific areas of the country. This pattern manifests itself in the maps illustrating the proportion of all loans made to SDA borrowers. Financially, farmers classified as FSA-eligible SDA farmers on the condition of race appear to be similar to non-SDA farmers but with significantly lower government payments and debt-to-asset ratios. These differences could be explained by the fact that SDA race farmers tend to be concentrated regionally, whereas non-SDA farmers are distributed much more uniformly across the nation. Types of agriculture vary regionally, and certain types of agriculture may not qualify for as many government payments and may require more solvency than other types of agriculture. Farmers classified as FSA-eligible SDA borrowers on the condition of gender are substantially smaller in size than FSA-eligible non-SDA operators as indicated by the significantly lower gross cash income, and less government payments, cash expenses, net income, farm assets, liabilities, and farm equity. However, they have higher solvency relative to non-SDA farmers. But, the differences in liquidity, repayment capacity, and financial efficiency between the two groups are not statistically significant.

FSA targeting of beginning farmers has resulted in this group receiving 42 percent of the OL loans, 39 percent of the OL principal, 68 percent of the FO loans, and 73 percent of the FO principal. This is consistent with legal mandates that require 35 percent of initial OL allocations and 70 percent of initial FO allocations to beginning farmers. Nationally, the penetration into the BF, OL, and FO markets combined is 3.16 percent while the corresponding figure for the overall family farm market is 3.37 percent. The difference in penetration is due to a great extent to the large number of eligible farms that are classified as beginning farmers in the penetration denominator and to a lesser extent to the two different data sources used for the penetration numerators. In terms of percentage of FSA loans made to BFs, three quarters of the states in the lower 48 make more than 35 percent of their OL and FO loans to BF borrowers. The percentage of loans made to BFs is especially high in the FO market, with an average of 68 percent of all FO loans originated to beginning farmers. Forty-six of the 50 states made 50 percent or more of their FO loans to BF borrowers.

As a group, FSA-eligible BF farmers have significantly less gross cash income, government payments, cash expenses, net farm income, assets, liabilities, and equity than the average non-BF farm operator. There are no statistically significant differences in solvency, repayment capacity and financial efficiency between the two groups. Beginning farmers appear to have limited financial resources and therefore are likely to be rejected by providers of conventional credit. While the inability to obtain conventional credit is one criterion for receiving direct loans, credit worthiness is also required by the FSA. In general the BF farmers have little experience and have not proven their ability to repay loans, so it should not be surprising that penetration into this market would be lower without added mandates. But the numbers of loans made are controlled by the percentages of the allocations to these groups and the eligibility criteria used to qualify beginning farmers.

While ARMS provides a rich set of data, the sample size makes certain estimates problematic. The 2002 Census of Agriculture data are used to define FSA eligible populations more specifically, making it possible to count relatively small populations like women and racial/ethnic categories more precisely. Our description of current FSA loan recipients' financial characteristics is enhanced by using FSA Farm and Home Plan data but somewhat hindered by the incomplete nature of this dataset and the lack of corresponding data for non-recipients. Hence reliance on ARMS data for estimating characteristics of non-recipients will continue so that effective comparisons can be made between recipients and non-recipients.

Within the scope of the analysis presented in this report, it appears FSA is serving its intended clientele. The effectiveness of FSA loan programs is further pursued in the following sections by investigating graduation rates and assessing whether default costs can be lowered. The borrowers receiving direct OL and FO loans are financially stressed on average compared with other farms that meet the general FSA criteria for loan eligibility. Thus the current FSA lending patterns in terms of serving targeted borrowers are consistent with the goals of the direct farm loan program. Greater coverage could undoubtedly be achieved with increased allocations, but the issue of allocation levels is beyond the scope of this study.

2. Duration in Farm Loan Programs and Financial Progress

The FSA Direct Farm Loan Programs (FLPs) are designed to bridge agricultural credit gaps, i.e., to provide loans to creditworthy farmers who are unable to obtain credit from conventional sources. Direct FLPs aim at improving farmer financial well-being so that farmers can move from using direct FLPs to conventional sources of credit with or without FSA guarantees. This implies farmers should graduate, i.e., exit FLPs and use conventional sources of credit, or at least improve their financial characteristics as time elapses. Little is known about the longitudinal behavior of FLP participants. Some interesting questions arise. Do participants make FLPs their long-term source of credit or do they move on? If they do exit FLPs, what is the reason for leaving, and what do they do thereafter? Also, do FSA participants improve their financial strength as a result of using FLPs?

2.1. Survey of Borrowers Originating FSA Direct Loans During FY 1994–1996

To answer the above questions, FSA Farm Loan Managers (FLMs) were surveyed to collect information on a sample of loans originated in FY 1994–1996. These three years were chosen for a variety of reasons. First, three years were chosen so that unique characteristics of any one year would not unduly influence the variables observed. These three years are representative of the 1990s in terms of net farm income.[38] Second, the Agricultural Credit Improvement Act of 1992 (P.L. 102-554) authorized the beginning farmer program. Starting sampling before 1994 would have resulted in a small sample of beginning farmers. Sampling later than 1996 would not have given sufficient time to obtain a long-run view of borrower payback and exit behavior.

During those three years 34,026 OL, 3,083 FO, and 8,359 EM loans were originated. The survey was needed because during the period of interest, borrower financial information at time of loan origination was not inputted by FSA into a linked, electronic system. So financial information and demographic data recorded on the Request for Direct Loan Assistance (FSA-410-1) and the Farm and Home Plan (FmHA 431-2) were not readily available. The survey approach, described in detail in appendix 2.A, was used to collect these data.

The sampling frame of all FY 1994–1996 originations was sampled to insure representation across five loan-program types: (1) FO loans for non-BF borrowers (FONONBF), (2) FO loans for BF borrowers (FOBF), (3) OL loans for non-BF borrowers (OLNONBF), (4) OL loans for BF borrowers (OLBF), and (5) EM loans (EM). The sample was chosen to have gender, racial, geographical, and time representation as described in appendix 2.A.

[38] For the 1990s, national net farm income in 1996 was the highest, 1995 the lowest, and 1994 in between. http://www.ers.usda.gov/data/farmincome/50State/50stmenu.htm. Accessed May 19, 2005.

2.1.1. Sampling Strategy and Geographical Distribution

The numbers of observations sampled as a function of loan program type, gender, and race are displayed in table 2.1. Several facts stand out. As discussed earlier in this report, the predominant FSA borrower race and gender are white and males. Because white males were relatively so abundant, white males were sampled at a rate of one in eighteen whereas all other gender and races were sampled at a rate of one in nine.[39] OL loans were originated at far higher levels than FO and EM loans. The level of EM loans is not reflective of any programmatic emphasis on SDA or BF borrowers since the frequency of EM loans is driven by natural disasters, which are unforeseen and occur irregularly.

There were 2,715 usable responses after cleaning the data out of a sample of 3,004 for a 90 percent response rate. This is very high as social science surveys go and can be attributed to the seriousness with which FSA reacted to the survey request. The lowest response rate in any particular gender/race cell with more than ten borrowers sampled was 77 percent. Thus there was good representation for all cells with more than ten sampled loans. For African Americans, Asian/Pacific Islanders, American Indian, Hispanics, and females, the response rates were 87, 96, 80, 88, and 89 percent, respectively. The response rates for the five different loan categories (FONONBF, FOBF, OLNONBF, OLBF and EM) ranged from a low of 88 percent to a high of 92 percent.

Figures 2.1–2.4 contain four dot maps showing the location of unique borrowers by county of residence in the lower 48 states responding to the survey by loan type group. Because the sampling was done by loan, a specific individual could appear more than once in the sample. Of the 2,715 usable questionnaires, 2,500 borrowers only had one loan in the sample during the three-year period; 104 borrowers had two loans; one borrower had three loans; and anoth-

Table 2.1. Gender and race response rates by loan type for survey of FY 1994–1996 loan originations

FONONBF*					FOBF*				
Gender/race	Male	Female	Family unit	Total	Gender/race	Male	Female	Family unit	Total
White	25	10	49	84	White	97	12	98	207
	24	8	47	79		86	10	87	183
	96.0%	80.0%	95.9%	94.0%		88.7%	83.3%	88.8%	88.4%
Black	3	0	5	8	Black	2	0	3	5
	3	0	4	7		1	0	3	4
	100.0%		80.0%	87.5%		50.0%		100.0%	80.0%
Asia/PI	1	0	2	3	Asia/PI	1	0	0	1
	1	0	2	3		1	0	0	1
	100.0%		100.0%	100.0%		100.0%			100.0%
Amln/AK	2	2	4	8	Amln/AK	3	1	6	10
	2	1	3	6		3	1	6	10
	100.0%	50.0%	75.0%	75.0%		100.0%	100.0%	100.0%	100.0%
Hisp	1	0	9	10	Hisp	2	0	4	6
	0	0	6	6		1	0	3	4
	0.0%		66.7%	60.0%		50.0%		75.0%	66.7%
Total sampled				113	Total sampled				229
Total response				101	Total response				202
				89.4%					88.2%

[39] Because of the different sampling rates, all the statistical analyses are done using weights for the observations. Since the two sampling rates were one in eighteen and one in nine, the respective weights were two and one.

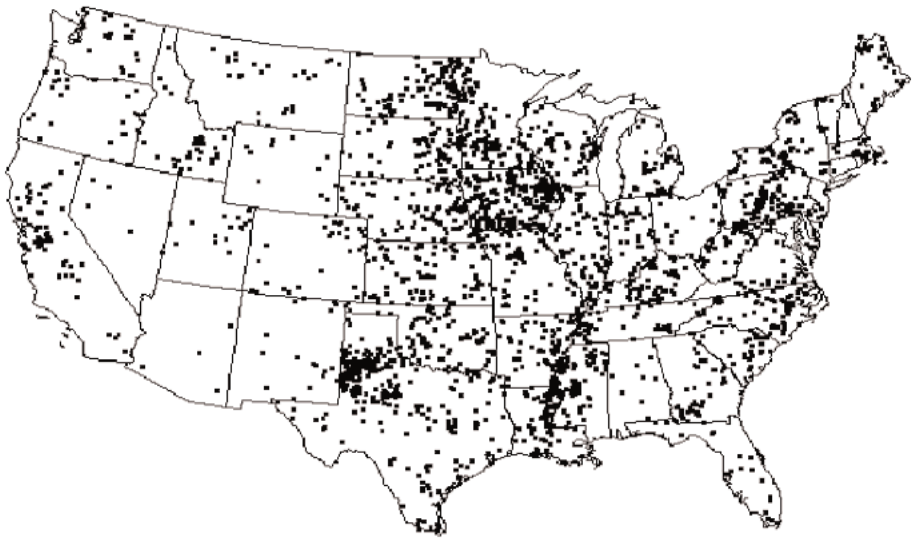
Table 2.1. Continued.

OLNONBF*					OLBF*				
Gender/race	Male	Female	Family unit	Total	Gender/race	Male	Female	Family unit	Total
White	564	74	741	1,379	White	220	35	135	390
	510	69	694	1,273		187	32	127	346
	90.4%	93.2%	93.7%	92.3%		85.0%	91.4%	94.1%	88.7%
Black	57	3	48	108	Black	22	1	11	34
	55	3	40	98		19	0	9	28
	96.5%	100.0%	83.3%	90.7%		86.4%	0.0%	81.8%	82.4%
Asia/PI	6	0	7	13	Asia/PI	2	0	4	6
	6	0	6	12		2	0	4	6
	100.0%		85.7%	92.3%		100.0%		100.0%	100.0%
Amln/AK	13	5	37	55	Amln/AK	13	3	9	25
	11	3	31	45		10	2	7	19
	84.6%	60.0%	83.8%	81.8%		76.9%	66.7%	77.8%	76.0%
Hisp	31	1	57	89	Hisp	9	0	14	23
	28	1	48	77		9	0	12	21
	90.3%	100.0%	84.2%	86.5%		100.0%		85.7%	91.3%
Total sampled				1644	Total sampled				478
Total response				1,505	Total response				420
				91.5%					87.9%

Table 2.1. Continued.

EM*				
Gender/race	Male	Female	Family unit	Total
White	162	12	225	399
	146	11	207	364
	90.1%	91.7%	92.0%	91.2%
Black	9	0	7	16
	6	0	5	11
	66.7%		71.4%	68.8%
Asia/PI	0	0	1	1
	0	0	1	1
			100.0%	100.0%
Amln/AK	1	1	2	4
	0	0	2	2
	0.0%	0.0%	100.0%	50.0%
Hisp	16	2	102	120
	14	2	93	109
	87.5%	100.0%	91.2%	90.8%
Total sampled				540
Total response				487
				90.2%

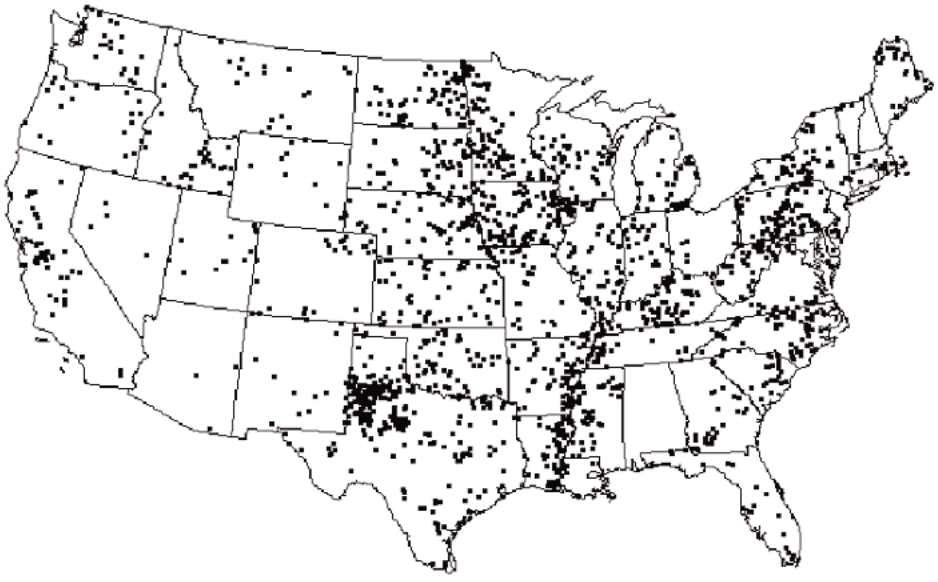
Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Figures in the first row for a given race are number sampled for a given gender. Figures in the second row are usable questionnaires returned. Third row figures are the response rate for the given gender/race combination. The "family unit" is an alternative gender class used by FSA.



Source: Computed from 2004 Survey of FY 1994–1996 New Loans

Each dot represents one unique borrower with a usable questionnaire by loan type. A borrower can only appear once in any map. There were 2606 unique borrowers. The 143 borrowers not located in the continental U. S. (48 states) are not shown in any of the four maps.

Figure 2.1. Total unique borrowers included as usable responses to the FSA borrower information survey of FY 1994–1996



Source: Computed from 2004 Survey of FY 1994–1996 New Loans

Each dot represents one unique borrower with a usable questionnaire for an OL loan.

Figure 2.2. OL borrowers included as usable responses to the FSA borrower information survey of FY 1994–1996 originations

Source: Computed from 2004 Survey of FY 1994–1996 New Loans

Each dot represents one unique borrower with a usable questionnaire for an FO loan.

Figure 2.3. FO borrowers included as usable responses to the FSA borrower information survey of FY 1994–1996 originations

Source: Computed from 2004 Survey of FY 1994–1996 New Loans

Each dot represents one unique borrower with a usable questionnaire for an EM loan.

Figure 2.4. EM borrowers included as usable responses to the FSA borrower information survey of FY 1994–1996 originations

er borrower had four loans. The maps indicate the broad geographical dispersion of the sample observations and are generally reflective of the population of FSA borrowers as shown in figures 1.11 – 1.16.

2.1.2. Borrower Demographics

Basic borrower demographic data by loan assistance type are presented in table 2.2. The results are consistent with a priori beliefs. Operator age at time of loan origination is in the early- to mid-forties for non-BF and non-SDA farmers. Beginning farmers have mean age of 29 except for the relatively older beginning SDA farmers who average 34 or 35 years of age. When the beginning farmer designation is removed, SDA and non-SDA farmers average about the same age. The group with the highest average age is composed of farmers receiving EM loans although the difference between them and regular OL borrowers is only about one-and-a-half years. In the 1997 Census of Agriculture (USDA/NASS, 1999) the average farm operator age is 54.3 so the FSA borrowers are distinctly younger than the overall farm population.

Mean years of farming experience range between 17 and 21 years for non-beginning farmers. The 1997 Census of Agriculture (USDA/NASS, 1999) reports an average 23.9 years among all farmers for years on the present farm. Thus the surveyed farmers are less experienced than the average for U.S. farms. As to be expected, beginning farmers have less farming experience than non-beginning farmers with means ranging between five and six years. Mean number of family members is between three and four for all programs except the two beginning, non-SDA farmer programs that have about 2.6 to 2.7 members which is reflective of their younger ages. A similar pattern arises with respect to marital status. Most borrowers are married but the range varies between 60 percent for non-SDA beginning farmers and 90 percent for EM borrowers. Eighty-seven percent of regular OL borrowers are married.

In constructing the sampling frame, data on race and gender were used from the loan-making records obtained from FSA records in St. Louis. There are some discrepancies in race and gender between the numbers reported by the FLMs on the surveys and those in the loan-making records. The analyses in this report use the race and gender reported on the survey instrument. For race and gender, the typical borrower sampled in the survey is a white male, consistent with the borrower demographics observed for the FY 2000–2003 data discussed in section 1.2. The predominant minorities are Hispanic and African American/Black although American Indian/Alaskan natives are active in the SDA programs. Note that just as with the FY 2000–2003 loan originations, women and minorities also obtain loans in the regular loan categories although most of their loans are from the SDA loan categories.

2.1.3. Borrower Balance Sheet Characteristics

Table 2.3 displays means of structural and financial characteristics of the sampled borrowers. Borrowers obtaining regular loans have larger operations with EM farmers having the largest acreage, OL farmers having slightly smaller acreage, and FO farmers having the least acreage. SDA and beginning farmers have smaller operations although the OL SDA farmers are not that much smaller than borrowers obtaining regular OL loans. Borrowers in all the loan categories devote most of their farm acreage to crops, except for beginning FO SDA farmers.

Borrower financial characteristics indicate that the surveyed farms are, on average, not as large in terms of assets and net worth as the average U.S. farm. Mean farm assets equal $275,176. The mean assets per farm in the U.S. averaged over 1994–1996 is $441,000.[40] EM borrowers have the highest mean assets at $438,878. Among the various OL and FO borrower categories, regular OL borrowers have the most assets at $313,482. Regular FO borrowers also

[40] http://www.ers.usda.gov/Data/farmbalancesheet/fbsdmu.htm. Accessed May 20, 2005.

Table 2.2. Basic demographic description of sampled borrowers originating loans from FY 1994–1996 by loan assistance type

Item	OLREG	OLBF	OLBFSDA	OLSDA	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
N (number of FY 1994–96 loans by assistance code)	23,557	6,351	1,139	2,979	660	1,728	339	356	8,359	45,468
n (number of observations)*	1,218	318	102	287	73	169	33	28	487	2,715
Mean age (years)	44.24	29.20	35.39	45.50	40.79	29.33	34.03	41.35	45.80	41.46
Mean years in farming	20.42	5.22	6.40	19.12	17.28	5.34	4.79	16.50	20.97	16.77
Mean total household members	3.29	2.64	3.69	3.20	3.58	2.66	3.56	3.27	3.45	3.21
Marital status (percent married)	87.10	60.10	74.00	79.00	81.80	59.60	89.50	84.60	90.00	81.00
Marital status (percent separated)	0.70	0.00	1.00	0.40	0.00	0.00	0.00	3.80	0.40	0.50
Marital status (percent unmarried)	12.10	39.90	25.00	20.60	18.20	40.40	10.50	11.50	9.60	18.00
Race (American Indian/Alaskan Native)**	0.21	0.32	14.95	11.84	0.00	0.00	18.42	16.67	0.24	2.58
Race (Asian/Pacific Islander)	0.00	0.00	5.61	3.29	0.00	0.00	2.63	10.00	0.12	0.77
Race (Black)	0.08	0.00	22.43	30.59	2.82	0.00	13.16	16.67	1.55	5.27
Race (Hispanic)	0.17	0.32	14.02	22.37	0.00	0.30	7.89	20.00	12.02	7.34
Race (White)	91.63	85.49	34.58	23.36	94.37	90.21	52.63	26.67	75.48	74.97
Race (other)	0.00	0.00	0.00	0.66	0.00	0.59	0.00	0.00	0.00	0.11
Race (unknown)	7.91	13.88	8.41	7.89	2.82	8.90	5.26	10.00	10.60	8.96
Gender (male)***	79.26	80.70	52.34	62.50	88.73	86.35	50.00	50.00	77.26	76.41
Gender (female)	0.92	1.12	39.25	26.32	2.82	0.59	44.74	30.00	2.38	6.12
Gender (family-unit)	11.50	6.70	0.93	4.93	7.04	0.31	5.26	10.00	8.93	8.99
Gender (male-owned organization)	2.29	1.28	0.93	0.66	0.00	0.59	0.00	0.00	2.98	1.81
Gender (female-owned organization)	0.21	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.12	0.22
Gender (unknown)	5.83	9.89	6.54	4.93	1.41	3.56	0.00	10.00	8.33	6.38
Gender (public body)	0.00	0.32	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.07

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
* Statistics in a given column may be based on fewer observations if there are missing values.
** Race as reported on survey and figures are percent for a given loan type.
*** Gender as reported on survey and figures are percent for a given loan type.

Table 2.3. Means of farm operation descriptors and balance sheet variables of loan originators by loan assistance type

Item	OL REG	OLBF	OLBF SDA	OL SDA	FO REG	FOBF	FOBF SDA	FO SDA	EM	ALL LOANS
N (number of FY 1994–96 loans by assistance code)	23,557	6,351	1,139	2,979	660	1,728	339	356	8,359	45,468
n (number of observations)*	1,218	318	102	287	73	169	33	28	487	2,715
Farm size (sum of acres owned and rented)	750	496	361	605	553	371	260	312	779	664
Crop acres/total acres	0.69	0.66	0.60	0.56	0.63	0.62	0.42	0.57	0.77	0.68
Total farm assets ($)	313,482	94,381	97,935	186,519	282,115	93,891	46,522	203,599	438,878	275,176
Total farm liabilities ($)	217,119	68,418	71,514	119,083	183,547	42,017	24,524	102,393	277,459	183,585
Farm net worth ($)	96,363	25,854	26,421	68,167	98,568	51,874	21,998	101,206	161,023	91,687
Total non-farm assets ($)	38,745	40,780	38,986	452,632	24,276	28,793	53,088	36,819	62,288	42,152
Total non-farm liabilities ($)	14,745	13,875	18,726	16,171	6,963	11,965	28,532	9,904	18,173	15,038
Total net worth ($)	118,009	54,704	45,221	94,488	115,959	69,771	46,554	124,056	196,057	116,307
FSA loans/total farm liabilities	0.51	0.27	0.19	0.49	0.31	0.11	0.09	0.28	0.35	0.40
Farm debt/farm asset	0.82	0.60	0.48	0.77	0.65	0.29	0.25	0.60	0.77	0.72
Total debt/total asset ratio	0.74	0.60	0.58	0.62	0.61	0.38	0.72	0.92	0.77	0.69

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values.

own more assets than any other FO borrower category. As expected, beginning farmers have the least assets with non-BF SDA borrowers having asset levels between those of regular and beginning farmers. The ordering of farm liabilities among the loan assistance types is similar to that of farm assets.

Overall net worth and farm net worth vary substantially among loan programs. The sample mean farm net worth is $91,687 and the comparable three-year average of net worth for U.S. farmers is $376,000.[41] Borrowers in the regular loan categories have higher total and farm net worth than those in the beginning programs.

The different net worth values likely reflect the age and station in the borrowers' life-cycles. The mean net worth values, both total and farm, of OL SDA farmers are between those of the regular and beginning farmers and FO SDA farmers have the highest FO mean net worth among FO borrowers. The EM farmers have much higher mean net worth than either FO or OL borrowers. However, this is not surprising since loan requirements for EM loans (a disaster) are different from those of either FO or OL loans. The mean debt-to-asset ratios indicate that most of these FSA borrowers are relatively heavily in debt and therefore the appropriate clients for FSA Direct Loans. It is interesting to note that at the mean, only regular OL and OL SDA borrowers have a majority or near majority of their farm liabilities originating with FSA prior to receiving their OL loan.

2.1.4. Borrower-Expected First Year Cash Flows

Table 2.4 gives the mean planned financial revenues and expenses of the farms for the first year of the loan by assistance type. In general borrowers anticipate more income from crops than livestock. This is particularly true of EM borrowers, which is indicative of disasters during this period being more likely harmful to crops than livestock. Notice also that the total cash farm income mean of $153,465 puts most of these farms in the National Commission on Small Farms' definition of small farms having less than $250,000 in gross receipts.[42] An important indication of the reliance of these borrowers on agricultural income comes from the non-farm income. For all borrowers the mean non-farm income is $14,405. However, the mean living expense is $19,056. This implies FSA Direct Loan clientele are operators who have farming as an important income source and rely on farm income to cover a portion of their living expenses. As reported in Mishra et al., the average household non-farm income of farmers for 1999 was $57,988. While this is an average for all farmers (including many hobby farms), it is clear the typical FSA Direct Loan borrower in FY 1994–1996 relied more on farm income than did many U.S. farm operators. Also, viewing the balance available and the debt service either due or planned, the borrowers do not have much capacity to withstand adversity and still be able to service debt.

2.1.5. Past Use of FSA Loans and Credit History Characteristics

The borrowers in the sample are largely repeat users of FSA programs as evident from table 2.5. For all loans, an estimated 73.5 percent went to borrowers who had previously obtained an FmHA (FSA) direct or guaranteed loan. In general OL loans had borrowers more likely to have previously used FSA loans than FO loans. As would be expected, beginning farmers are less likely to have used FSA programs.

However, among OL beginning farm loans, over 50 percent were associated with borrowers who had pre-

[41] http://www.ers.usda.gov/Data/farmbalancesheet/fbsdmu.htm. Accessed May 20, 2005.
[42] The National Commission on Small Farms defines a small farm as, "…farms with less than $250,000 gross receipts annually on which day-to-day labor and management are provided by the farmer and/or the farm family that owns the production or owns, or leases, the productive assets." (p. 18). (See: http://www.csrees.usda.gov/nea/ag_systems/pdfs/time_to_act_1998.pdf. Accessed June 1, 2005). Total cash farm income as used in sections 2 and 3 includes other farm income which we assume is included in the Commission's definition of receipts. Note that this differs slightly from the small farm definition in sections 1.2–1.3.

viously used FSA programs although it is unknown how many of these previous loans may have been Youth loans. OL SDA borrowers also tended to be repeat users with just less than 80 percent of loans having borrowers who had been previous users of FSA loans. Among FO loans, beginning farm-loan borrowers are substantially less likely to be repeat users with SDA beginning farmer loans and non-SDA beginning farmer loans having 31.6 percent and 19.8 percent, respectively, of repeat users. A surprisingly high proportion of EM loans (77 percent) have borrowers with previous FSA credit. Our initial expectation was that EM users would include a broader group of farms since natural disasters would likely affect most farms in the impacted region similarly. Since EM funds are limited, those borrowers with a previous FSA loan(s) may be able to get into queue earlier than borrowers with no previous FSA credit because of the former group's familiarity with FSA programs.

The credit history of the borrowers is also reflected in a loan application question that asks whether the borrowers have ever been in receivership, discharged in bankruptcy, or filed a petition for reorganization in bankruptcy. Only 5.4 percent indicated they had (table 2.5). A larger percentage of the borrowers, 14.5 percent, had a prior delinquency with federal debt. OLBF and FOBF borrowers had lower delinquency rates and this is likely attributable to their younger ages.

Table 2.4. Means of financial characteristics of the FSA borrowers' planned business year by loan assistance type

Item	OLREG	OLBF	OLBFSDA	OLSDA	FOREG	FOBF	FOBFSDA	FOSDA	EM	All Loans
N (number of FY 1994–96 loans by assistance code)	23,557	6,351	1,139	2,979	660	1,728	339	356	8,359	45,468
n (number of observations)*	1,218	318	102	287	73	169	33	28	487	2,715
Crop income ($)**	95,635	60,387	51,147	66,773	61,269	44,321	25,826	60,844	164,787	94,688
Livestock income ($)	62,289	46,924	49,003	28,324	55,098	30,720	21,770	48,660	52,809	53,390
Other farm income ($)	6,615	3,109	3,374	3,657	3,545	2,843	957	13,024	11,200	6,333
Total cash farm income($)	163,037	109,917	102,548	98,758	118,914	77,584	48,553	122,528	228,738	153,465
Net farm cash income ($)	38,346	22,495	23,087	23,499	29,573	20,918	7,556	35,069	55,489	36,233
Non-farm income ($)	14,010	12,162	15,760	16,357	18,812	18,802	24,782	13,992	13,055	14,405
Cash family living expense($)	20,153	15,991	15,977	15,958	19,784	16,527	18,708	15,505	20,682	19,056
Net cash income($)	32,040	19,059	22,986	22,533	26,539	22,992	12,721	33,556	49,168	31,590
Interest expense ($)	13,165	7,086	8,148	7,080	11,252	8,833	7,219	10,755	20,031	12,660
Balance available ($)	106,998	71,278	73,135	67,531	71,201	54,333	33,347	85,139	150,688	101,119
Gross cash income ($)	173,496	120,239	111,449	113,503	135,616	95,005	73,335	136,581	239,178	165,026
Total amount due this year (principal and interest) ($)	104,330	68,339	57,855	65,041	66,637	45,390	29,123	76,495	143,282	96,687
Total planned principal and interest to be paid ($)	99,458	65,998	56,063	61,306	65,407	46,115	28,929	69,564	137,073	92,584

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values.
**All items were taken directly from the Farm and Home Plan and not computed. So, for example, Total cash farm income is the sum of Crop income, Livestock income and Other farm income. However, all four entries were recorded from the FHP so that Total cash farm income was not computed in this table as the sum of the three reported components.
Net farm cash income is Total cash farm income less Operating expenses (not displayed). Net cash income is Net farm cash income plus Non-farm income less Cash family living expense.
Balance available is beginning cash plus loans and other credit plus interest less capital and carryover expenses. Gross cash income is the sum of Total cash farm income and non-farm income.

Table 2.5. FSA borrowers' credit history by loan assistance type

Item	OLREG	OLBF	OLBFSDA	OLSDA	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
N (number of FY 1994–96 loans by assistance code)	23,557	6,351	1,139	2,979	660	1,728	339	356	8,359	45,468
n (number of observations)*	1,218	318	102	287	73	169	33	28	487	2,715
Applicant been in receivership, discharged in bankruptcy, or filed a petition for reorganization in bankruptcy? **										
(percent yes)	6.0	4.0	6.1	4.6	6.1	1.3	2.8	7.7	6.5	5.4
(percent no)	94.0	96.0	93.9	95.4	93.9	98.7	97.2	92.3	93.5	94.6
	(0.7)	(1.2)	(2.4)	(1.4)	(2.9)	(0.9)	(2.7)	(5.3)	(1.3)	(0.5)
Has this applicant been delinquent on any Federal Debt?										
(percent yes)	18.7	6.8	15.4	14.1	9.1	1.3	9.4	20	14.8	14.5
(percent no)	81.3	93.2	84.6	85.9	90.9	98.7	90.6	80	85.2	85.5
	(1.2)	(1.5)	(3.8)	(2.3)	(3.5)	(0.9)	(5.2)	(9.3)	(1.9)	(0.8)
Has borrower ever obtained a direct loan or guarantee from FmHA?										
(percent yes)	88.4	53.2	45.5	79.3	76.1	19.8	31.6	53.8	77	73.5
(percent no)	11.6	46.8	54.5	20.7	23.9	80.2	68.4	46.2	23	26.5
	(1.0)	(3.0)	(5.3)	(2.6)	(5.1)	(3.1)	(8.3)	(10.6)	(2.0)	(0.9)
Was loan paid in full?										
(percent yes)	52.9	46.4	50.0	46.0	43.5	58.1	36.4	57.1	47.3	50.4
(percent no)	47.1	53.6	50.0	54.0	56.5	41.9	63.6	42.9	52.7	49.6
	(1.6)	(4.2)	(8.3)	(3.6)	(7.3)	(8.9)	(15.2)	(13.2)	(2.9)	(1.2)
Was the loan debt settled or was the applicant ever released from personal liability as part of a debt settlement action?										
(percent yes)	4.9	3.9	8.5	4.6	4.7	1.3	8.3	8.0	3.4	4.5
(percent no)	95.1	96.1	91.5	95.4	95.3	98.7	91.7	92.0	96.6	95.5
	(0.7)	(1.2)	(2.9)	(1.3)	(2.6)	(0.9)	(4.7)	(5.5)	(0.9)	(0.4)

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values.
**Data in this table come from five questions asked on the Request for Direct Loan Assistance (FSA-410-1). The last two questions are ambiguous although they might be of interest to those more familiar with the loan application process. In particular, the question asking if a previous direct or guaranteed loan had been paid in full is not informative if more than one loan had been obtained. Furthermore, a prior loan active at the origination of a new loan may be performing satisfactorily but still not be paid in full. The subsequent question about the loan debt settled or applicant released is also ambiguous for multiple loans. Figures in parentheses are standard errors that apply to both percentages directly above.

2.2. Duration and Graduation

One goal of the FSA Direct loan program is to help creditworthy borrowers fill an existing credit gap so that they may graduate to conventional sources of credit or be free of credit needs altogether in the future.[43] In this section, the survey data for loans made in FY 1994–1996 are examined to measure borrower lengths of loan, graduation rates and types of exits from direct FLPs. This analysis is initiated by examining the percentages of loans that have been terminated either by having been paid in full or by other means, the length of time to these outcomes, and the types of exits from FLPs taken by the borrowers.

2.2.1. Identifying a Loan's Termination Status

A loan was classified as terminated by two sets of criteria. In designing the survey instrument, it was intended that termination status would be determined by the response to two questions. The first question asked if the loan had been paid in full, with a positive response indicating termination. Then respondents were asked if the loan had terminated due to foreclosure, bankruptcy, or debt write-off. A positive response would indicate the loan as terminated. In subsequent responses to three additional questions it became clear that some loans not considered terminated by the above two questions were considered terminated by the FLMs.[44]

A loan originated in FY 1994–1996 was classified as terminated if the FLMs indicated on the survey either of the following situations: that the loan had been paid in full or terminated due to foreclosure, bankruptcy or write-off, or the borrower had no loans of

[43] Graduation in this study means no longer using direct FLPs but continuing farming with or without credit.
[44] One solution to this ambiguity would have been to ask FSA to determine if a given loan was active or terminated from its loan servicing records. This is a more daunting task than might first be thought. The research team's understanding of the loan record-keeping system is that a given loan can be assigned different loan numbers over time if it is restructured or consolidated. Thus a given loan number might have a terminated status but really be active under a different number. Because the programming task to unsnarl and identify such loans was formidable, this approach was not taken.

that type active as of November 30, 2004.[45] Using the above method for determining loan status, 78 percent of the 2,715 loans were classified as terminated. Furthermore, for 2,606 unique borrowers sampled, 55 percent had no active FO, OL, or EM loans as of November 30, 2004. From these two statistics, it is clear that direct loans are terminated and, more importantly, over half the borrowers active in FY 1994–1996 had exited within no more than approximately nine years.

2.2.2. Overall Loan Termination Rates and Length of Terminated Loans

Table 2.6 displays the termination percentages by loan program. The overall termination rate is 77.7 percent. This statistic is very much influenced by the preponderance of OL loans in the sample. OL loans come in two types based on length of maturity - one year and seven years. Because of these very fundamentally different time spans for the two OL loan types, tables 2.6, 2.7, and 2.8 have an expanded number of columns to differentiate between the two OL loan maturities.

It is clear there are substantial differences among OL, FO, and EM loan termination percentages and lengths of time to termination. The most striking difference is between FO loans and the other two groups. When the various OL and various FO loans are combined, the aggregate termination rates are 84, 52, and 75 percent for OL, FO, and EM loans. The differences between these three groupings are statistically significant for all three pair-wise comparisons. It is clear that FO loans did not terminate as of November 30, 2004 nearly as often as OL and EM loans. This is to be expected given the long-term nature of the loans. Nonetheless, approximately half of the FO loans had terminated for some reason. The 84 percent rate for OL loans is expected and ideally should be 100 percent since a loan in the sample could not have been originated after September 30, 1996. This means all loans had at least eight years to terminate and 16 percent of the OL loans did not. These loans have likely been restructured or consolidated.

The finding that 75 percent of EM loans terminated is encouraging. Furthermore, an estimated 81 percent of the terminated EM loans were paid in full. EM loans are made to operators who have encountered adversity and had to take loans under financially stressful circumstances. Nonetheless, most of these loans ended by November 30, 2004.

The mean length of time to loan termination is displayed in table 2.6. As to be expected, OL loans have much shorter durations than FO loans. In particular, the mean length of loans for FO loans will increase as more of these loans are paid back. A similar effect will happen with OL loans but since the proportion of OL loans still active is so much smaller than for FO loans, the increase in OL loan length will be less than for FO loans. One-year loans make up about half of the OL loans in each OL category in table 2.6. Ninety-one percent of the one-year loans are terminated and 74 percent of seven-year loans are also terminated. Given the short durations of the mean loan length times, it is clear that many seven-year loans terminated early. The mean lengths of OL one-year loans exceed the maturity and this is surprising. Since these are typically annual operating loans, it would be expected they would be paid back on time. As discussed shortly, the mean length of OL loans paid-in-full is less than when paid in full loans are combined with loans terminated in other ways. The means for all loan lengths are clearly affected by the problem loans.

[45] FSA furnished the number of active OL, FO, and EM loans as of November 30, 2004 for each of the 2,715 lender identification numbers from its loan servicing database. If a borrower was in the sample as a result of an OL origination in FY 1994-1996, for example, and had no OL loans outstanding as of November 30, 2004, we concluded that the OL originated in FY 1994-1996 was terminated. The same analysis was undertaken for FO and EM loans. This approach almost surely undercounts the actual number of terminated loans.

Table 2.6. Termination percentages and mean loan length by loan type for FY 1994–1996 sample

Item	OLREG 1yr	OLREG 7yr	OLBF 1yr	OLBF 7yr	OLBF SDA 1yr	OLBF SDA 7yr	OLSDA 1yr	OLSDA 7yr	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
n (number of observations)*	695	523	163	155	45	57	145	142	73	169	33	28	487	2,715
Percent of loans terminated by November 30, 2004														
	91.39	71.88	90.06	79.02	84.44	66.13	89.54	68.21	45.77	53.41	55.26	43.33	74.76	77.70
	(1.06)	(1.97)	(2.35)	(3.28)	(5.46)	(6.32)	(2.55)	(3.92)	(5.87)	(3.85)	(8.79)	(9.54)	(1.97)	(0.80)
Mean time from FY 1994–1996 loan origination to loan termination (years)														
	1.62	5.63	1.54	5.60	1.98	5.92	1.60	5.21	7.27	6.48	6.69	7.41	5.38	3.75
	(0.09)	(0.13)	(0.15)	(0.21)	(0.42)	(0.41)	(0.17)	(0.28)	(0.42)	(0.27)	(0.68)	(0.88)	(0.15)	(0.07)

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values. Figures in parentheses are standard errors.

The above statistics document that most FSA Direct loans do terminate reasonably near maturity. The question remains as to how the loans ended, either due to getting paid off or due to some form of loss. Further, an important question remains as to whether borrowers simply pay off one FSA loan, then get a new direct loan and remain lifelong FSA loan clients. These issues are addressed below.

2.2.3. Characteristics of Loans Paid in Full

In assessing the effectiveness of the loan programs, it is important to examine the rate at which loans are paid back. One measure of program success is the number of loans paid in full. Table 2.7 provides data on the proportion of loans indicated as paid in full.[46] The majority of the one-year and seven-year OL loans originated in FY 1994–1996 were paid in full as of November 2004. As would be expected, the payback rates are higher for the one-year loans than for the seven-year loans. In general the paid-in-full rates for OL loans do not differ markedly among the regular, beginning farmer, and SDA groupings for a given maturity length, except that SDA loans have a lower rate for seven-year loans although only the OLBFSDA is significantly different from the OLREG and OLBF rate. The percentages of FO loans paid in full are understandably lower. FO loans are long-term loans, hence they are not expected to be paid back rapidly. Ideally, FO loans would be paid back when the borrower had established sufficient financial strength to obtain conventional credit to refinance outstanding debts. However, borrowers who are performing satisfactorily on FO loans have little incentive to refinance their fixed interest-rate loans with credit elsewhere since the interest rates associated with FO loans are frequently less than those offered elsewhere. However, over time interest rates offered elsewhere may become more competitive than their FO fixed rate, creating an incentive for borrowers to refinance. Such an interest rate environment has recently occurred. The interest rates on long-term loans offered by some creditors since 2001 have become less than those of FO loans originated during FY 1994–1996 (USDA/ERS, 2003).

There is evidence in the data that many of the direct FO loans paid in full are being replaced with conventional credit. In table 2.7 it can be seen that the proportions of paid-back FO loans financed with conventional or FmHA (or FSA) guaranteed credit are much higher than the proportions for OL loans. Many OL loans, particularly one-year loans, are undoubtedly paid back, and then new loans are

[46] A loan is classified as paid in full only if the response to the paid-in-full question was "yes". That means observations on a number of loans that were terminated and presumably paid-in-full but not so indicated are omitted in the statistics for paid-in-full loans. Also, paid in full does not rule out the possibility of a loan having gone through foreclosure, bankruptcy, or debt write-off. Sixteen of the 1,418 loans indicated as paid in full also were indicated as having gone through foreclosure, bankruptcy, or debt write-off. These loans may have been paid in full because the value of liquidated collateral was sufficient to repay the loan.

Table 2.7. Characteristics of loans paid in full at time of survey

Item	OLREG 1yr	OLREG 7yr	OLBF 1yr	OLBF 7yr	OLBF SDA 1yr	OLBF SDA 7yr	OLSDA 1yr	OLSDA 7yr	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
n (number of observations)*	695	523	163	155	45	57	145	142	73	169	33	28	487	2,715
Loans paid in full**	469	251	99	70	25	18	85	60	23	68	11	8	231	1,418
Loans paid in full (percent)	79.6	56.0	78.5	54.6	64.1	35.7	73.0	47.8	34.6	44.3	40.0	29.6	57.1	62.4
	(1.7)	(2.4)	(3.6)	(4.4)	(7.7)	(7.0)	(4.1)	(4.6)	(5.9)	(4.0)	(9.4)	(9.1)	(2.5)	(1.0)
For loans paid in full, average length of loan (years)	1.3	5.5	1.1	5.7	1.2	6.3	1.1	5.2	7.5	6.5	7.0	7.7	5.3	3.5
	(0.07)	(0.14)	(0.10)	(0.22)	(0.15)	(0.47)	(0.12)	(0.32)	(0.46)	(0.27)	(0.71)	(0.96)	(0.16)	(0.08)
Loans paid in full paid off with conventional credit or FmHA guaranteed credit (percent)	7.3	27.9	6.3	26.2	10.5	27.8	6.3	21.7	55.8	65.5	33.3	0.0	31.7	20.4
	(1.3)	(3.1)	(2.5)	(5.6)	(7.0)	(11.0)	(2.7)	(6.2)	(10.6)	(6.2)	(14.7)	(0.0)	(3.5)	(1.2)
For loans paid in full, percentage with at least one restructuring?	4.3	9.9	1.9	8.2	0.0	4.8	2.0	9.3	4.2	3.0	7.9	6.7	4.4	5.6
	(0.77)	(1.31)	(1.07)	(2.20)	(0.0)	(2.74)	(1.12)	(2.66)	(2.39)	(1.31)	(4.42)	(4.58)	(0.97)	(0.46)
Number of years from date of loan to first restructuring for loans with at least one restructuring and paid in full	1.5	2.9	***	2.2	***	***	***	2.4	***	2.2	***	***	3.3	2.5
	(0.25)	(0.29)		(0.53)				(0.54)		(0.62)			(0.49)	(0.16)

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values. Standard errors are in parentheses.
**A loan not paid in full could still be active or terminated.
***Statistic not reported because there were five or fewer observations.
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obtained for different input purchases. This implies no need to refinance the loan because the length of time is too short to make it worth the transaction cost. The more relevant question for OL loans paid in full is whether the borrowers graduate from FSA credit and move on to conventional forms of credit. As noted earlier, most FY 1994–1996 borrowers were not new FSA borrowers. The graduation rates of FSA borrowers are explored shortly.

The estimated, mean loan durations for the OL loans indicate that loans paid in full were paid off near the agreed maturity of the loans. That is, the one-year loans were paid off in about a year and the seven-year loans within seven years. Those durations will increase some, particularly for the seven-year loans, as loans still active are paid off. However, given that most of the loans have been paid off, the loan durations are not likely to increase substantially.

A small percentage of paid-in-full loans did experience restructurings. For the total sample, 5.6 percent of the loans paid in full had at least one restructuring. Seven-year loans were more likely to experience a restructuring than the one-year loans of the same type. For regular one-year OL loans paid in full, 4.3 percent experienced a restructuring, and 9.9 percent of regular seven-year OL loans paid in full experienced restructurings. The difference is statistically significant. It would be expected that seven-year loans would have a higher rate of restructurings since there is more exposure to unplanned events over time. The restructurings for regular seven-year OL loans come later during the life of the loan, as would be expected, than for the one-year loans. Nonetheless, the seven-year loans experience restructuring early on in the course of the loan—less than a mean of three years into the loan. Like OL loans, restructurings occur with similar frequency for FO and EM loans paid in full.

Restructurings come fairly early in the loan except for regular OL one-year loans. The mean time to first restructuring, excluding EM loans, is less than three years for all loan categories having at least six or more restructurings. Except for regular OL loans, the stan-

dard errors are large enough that no significant differences can be found among mean times to first restructuring.

2.2.4. Characteristics of Loans Terminated with a Loss

The Agricultural Credit Act of 1987 (P.L. 100-233) established rules allowing FmHA (or FSA) to restructure delinquent loans with the objective of keeping farmers on the farm at the lowest cost to the Government. Loan write-down and debt settlement (or write-off) programs were established. These programs are available to the borrower after servicing actions, such as reducing interest rates or rescheduling debt, have been considered when a loan becomes delinquent. A loan write-down is a situation where the borrower continues with FSA. The loan balance may be written down to the calculated net recovery value of the collateral (market value less liquidation costs). If this servicing action fails to produce a successful debt repayment plan, the debt settlement program is considered. Debt settlements and write-offs are situations where the borrower pays off the loan at the calculated net recovery value if the borrower is able to receive funds from other sources (USDA/ERS, 1991). A debt settlement is considered final whereas a loan write-down and write-off may be subject to recapture if funds subsequently become available to the borrower. It is our understanding that recapture of loan write-downs and write-offs have been relatively infrequent. Therefore, they are considered as loan losses for this study.

Loan write-downs and write-offs[47] are relatively infrequent for the loans in the sample just as recaptures of them have been in general. Only two percent of the loans had experienced a write-down since origination. This statistic is for both active and terminated loans. Table 2.8 reports frequencies and amounts of write-downs and write-offs for terminated loans. Eleven percent of terminated loans were not-paid-in-full. The greatest source of not-paid-in-full, terminated loans was OL loans to beginning farmers except for those with one-year loans. It is not surprising that FO loans experience lower percentages of not paid in full. Loans in financial difficulty also seem to take a long time to be terminated, particularly the one-year loans. For regular one-year OL loans not paid in full, the mean length of time to termination was 5.2 years. For OL loans not paid in full, OL regular seven-year loans take somewhat longer than the OL regular one-year loans with a mean of 6.3 years. However, a larger proportion of the seven-year loans were active at the time of the survey so this 6.3 figure will increase more over time than the one-year figure.

The proportions of loans terminated due to foreclosure, bankruptcy, or debt write-off are approximately the same as the proportions of loans terminated but not paid in full. For the whole sample, about 8.3 percent of terminated loans were terminated due to foreclosure, bankruptcy, or debt write-off. The mean loss for all 169 loans reporting a loss was $57,806. The comparable mean figure for initial loan amount was $62,001.[48] The major source of monetary losses is from loans terminated due to foreclosure, bankruptcy, or debt write-off.[49] One-year regular OL loans had a mean loss of $56,067 among the 8.5 percent of borrowers who experienced terminated loans. OL seven-year loans had a lower mean loss of $31,416 and a lower percent of affected borrowers at 7.4 percent. OL BF farmers had a higher percentage of loans terminated due to foreclosure, bankruptcy, or debt write-off than the regular loans but only the seven-year percentage is statistically different from the two regular OL percentages. SDA OL borrowers have similar percentages to regular OL loans except for SDA BF loans, which have a significantly higher percentage for seven-year loans. The various FO loan

[47] Loan write-offs are assumed to include debt settlements in this study.
[48] The amount owed at termination could exceed the initial loan amount because of loan restructuring and accrued interest.
[49] The FLMs were also asked the level of losses due to write-downs, and only 20 write-downs (mean of $76,747) were reported.

Table 2.8. Characteristics of terminated FSA loans experiencing losses

Item	OLREG 1yr	OLREG 7yr	OLBF 1yr	OLBF 7yr	OLBF SDA 1yr	OLBF SDA 7yr	OLSDA 1yr	OLSDA 7yr	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
n (number of observations)*	695	523	163	155	45	57	145	142	73	169	33	28	487	2,715
Percent of terminated loans not paid in full	10.1 (1.1)	11.0 (1.4)	9.9 (2.4)	16.7 (3.0)	17.8 (5.7)	27.4 (6.0)	13.7 (2.9)	16.6 (3.2)	5.6 (2.7)	4.7 (1.6)	10.5 (5.1)	6.7 (4.6)	11.1 (1.5)	11.0 (0.6)
For terminated loans not paid in full, mean length of loan(years)	5.2 (0.40)	6.3 (0.42)	4.9 (0.49)	4.6 (0.51)	**	5.2 (0.76)	4.7 (0.49)	5.0 (0.68)	**	**	**	**	5.4 (0.48)	5.4 (0.18)
For terminated loans not paid in full, mean length of time between origination date and first restructuring (years)	1.3 (0.10)	2.6 (0.26)	1.0 (0.09)	1.6 (0.26)	**	2.8 (0.47)	1.3 (0.22)	2.3 (0.46)	**	**	**	**	1.8 (0.28)	1.8 (0.10)
Percent of terminated loans due to foreclosure, bankruptcy or debt write-off	8.5 (1.2)	7.4 (1.2)	9.6 (2.6)	16.1 (3.3)	10.3 (4.9)	23.6 (5.9)	12.9 (3.0)	10.4 (2.7)	3.1 (2.2)	2.6 (1.3)	9.1 (5.1)	3.8 (3.8)	6.9 (1.3)	8.3 (0.6)
Mean amount of loss from loans terminated due to foreclosure, bankruptcy or debt write-off	56,067 (8,740)	31,416 (5,491)	112,907 (28,977)	53,179 (8,732)	**	37,407 (9,437)	46,457 (14,719)	52,262 (17,822)	**	**	**	**	87,940 (22,543)	57,806 4,871
Number of years from date of loan to termination by foreclosure, bankruptcy or debt write-off	1.6 (0.09)	5.6 (0.13)	1.5 (0.15)	5.6 (0.21)	2.0 (0.42)	5.9 (0.41)	1.6 (0.17)	5.2 (0.28)	7.3 (0.42)	6.5 (0.27)	6.7 (0.68)	7.4 (0.88)	5.4 (0.15)	3.8 (0.07)

Source: Computed from 2004 Survey of FY1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values. Standard errors are presented in parentheses.
**Statistic not reported because there were five or fewer observations.

types have lower percentages of loans terminated due to foreclosure, bankruptcy, or debt write-off than their counterpart seven-year OL loans. But the differences are only statistically significant between seven-year OLBF and FOBF loans.

2.2.5. Frequency and Type of Borrower Exits from FSA Direct Loan Programs

As noted earlier, 55 percent of the loans were by borrowers who had exited direct FLPs as of November 30, 2004. Table 2.9 lists the seven different reasons the FLM could indicate as the reason for exit. The FLMs could also report unknown. The statistics for the two FO SDA programs should be interpreted cautiously because they are based on small samples.

The FO SDA frequencies here are merely suggestive and included for completeness of the table. Several facts stand out in table 2.9. First, the most frequent type of exit was graduation to conventional credit, i.e., *not* a transitional step through FSA guaranteed programs. Only 9.1 percent of those exiting any of the loan programs used FSA guarantees. The next fact is that only about a third of exits used conventional credit. This result is surprising since we expected a larger proportion. Overall, fewer than half the borrowers continued farming with credit. An exception to this behavior is FO BF, which showed a much larger proportion of borrowers exiting via the use of conventional credit. This indicates some program success since these beginning farmers used FLPs early on and then continued without the help of FSA programs.

About 10 percent of those exiting continued farming and no longer needed credit. This could imply any number of things such as scaling back the operation, finally paying off all loans, or getting alternative sources of income to support the farm operation. It

Table 2.9. Type of exit by loan type for FY 1994–1996 borrowers exiting the FSA Farm Loan Program by November 30, 2004

Item	OLREG	OLBF	OLBFSDA	OLSDA	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
Number of exited borrowers*	536	148	43	104	27	71	12	9	217	1,167
Percent of borrowers who continued farming and graduated to FSA guaranteed credit**	9.2 (1.3)	10.2 (2.5)	4.4 (3.1)	3.5 (2.1)	7.5 (5.1)	8.5 (3.3)	0 0.0	0 0.0	11.1 (2.2)	9.1 (0.9)
Percent of borrowers who continued farming and graduated to conventional non-FSA credit	33.3 (2.0)	33.4 (3.9)	22.2 (6.7)	29.2 (4.8)	41.5 (9.5)	62.0 (5.8)	28.6 (12.8)	11.1 (10.5)	31.6 (3.3)	34.6 (1.4)
Percent of borrowers who continued farming and no longer needed credit	7.6 (1.1)	6.8 (2.0)	2.2 (2.2)	13.3 (3.4)	11.3 (6.2)	11.3 (3.8)	7.1 (7.0)	22.2 (13.9)	16.2 (2.4)	9.7 (0.9)
Percent of borrowers who left farming voluntarily other than retirement	21.9 (1.8)	35.2 (3.9)	44.4 (7.7)	23.0 (4.3)	26.4 (8.6)	12.7 (4.0)	50.0 (15.2)	44.4 (16.6)	19.8 (2.8)	23.7 (1.3)
Percent of borrowers who retired from farming	8.9 (1.2)	2.0 (1.2)	0 0.0	14.2 (3.3)	5.7 (4.1)	0 0.0	0 0.0	11.1 (10.5)	6.9 (1.8)	6.9 (0.8)
Percent of borrowers who left farming involuntarily other than death	12.7 (1.4)	12.3 (2.7)	20.0 (6.0)	9.7 (2.8)	3.8 (3.7)	2.8 (2.0)	14.3 (9.6)	11.1 (10.5)	9.0 (2.0)	11.1 (0.9)
Percent of borrowers who left farming due to death	6.3 (1.1)	0 0.0	6.7 (3.7)	7.1 (2.4)	3.8 (3.7)	2.8 (2.0)	0 0.0	0 0.0	5.4 (1.5)	5.0 (0.6)

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Note: This row gives the number of loans whose originators left the FLPs by November 30, 2004 and for whom the FLM gave a reason for exiting.
** Figures are the percentage of borrowers exiting for a given reason from the loan program indicated in the column. All columns sum to 100 percent except for rounding error. Figures in parentheses are standard errors.

could also involve leasing some or most land or sale of some farming assets. The reasons were not collected in the survey. Borrowers also left farming voluntarily for reasons other than retirement (23.7 percent of all exited loans) and for retirement (6.9 percent). Five percent of the loans were terminated due to the farmer's death. It is not clear if such loans can be considered terminated because a relative or spouse could have assumed the loan or refinanced it with FSA under a new name. Overall, 53.4 percent of the exiting farmers graduated, i.e., continued farming without FLP Direct Loan assistance.

Three of the four SDA categories display the highest proportions for exiting farming voluntarily. However, this may be misleading. These three categories have small samples and OLSDA—which has more observations than the other three SDA categories combined—has an exit rate similar to the other non-SDA programs.

Only about 11 percent of exited borrowers left involuntarily. The highest proportion of borrowers leaving involuntarily was for the OLBFSDA assistance type but the proportion, 20 percent, has a large standard error so that the rate is no different from the others listed except FOREG and FOBF. Rates of involuntary exit were higher for OLREG and OLBF than their FO counterparts. Rates for beginning farmers were not statistically different from those for non-beginning farmers within the OL and FO programs, respectively.

The findings in table 2.9 must be interpreted in the appropriate time context. Borrowers in the sample are those who initiated loans in FY 1994–1996. The termination status is as of November 30, 2004. In subsequent years more borrowers, particularly those holding FO loans, will exit the program. If table 2.9 were constructed with termination status as of November 30, 2005 the results would be somewhat different than with the November 30, 2004 date. In addition, there is the possibility that some borrowers who were inactive as of November 30, 2004 might initiate new loans in the intervening year and thereby have their status changed from terminated to active.

Given these caveats, table 2.9 gives a snapshot in time of borrower status. Borrowers had approximately nine years since originating loans in FY 1994–1996. A perspective for interpreting table 2.9 is to consider it as a long-run portrayal. That is, borrowers do leave the program and most of them surely leave permanently. We know from looking at the demographics of the borrowers at origination that they tended to be younger than the farming population in general. It is unlikely borrowers who have exited and are now in their fifties would become FSA borrowers again although an emergency loan would be the most obvious reason for re-entry. Since the mean age of those who exited is only a year greater than those who were still FSA debtors, we would expect future exits to be shaded more toward retirement and death than the current rates. It is more difficult to speculate on those continuing farming versus those leaving farming. To the extent farmers leave farming for more lucrative off-farm employment, such chances probably diminish as they age. However, older farmers do tend to be less indebted (Gale) so the likelihood of continued farming without any credit needs is a more likely possibility. A reasonable conjecture is that those exiting post 2004 will likely have fewer credit needs, fewer good off-farm employment opportunities, and be more likely to retire than those who left before 2004.

Overall, it is clear borrowers exited FLPs for a variety of reasons and no one reason dominates. It is surprising that about 42 percent of those loans terminated had borrowers who left farming for some other occupation or lifestyle. This suggests FSA Direct loans make it possible for some people to try farming and then seek alternative uses of their time. Such exits certainly are not the typical path envisioned for a borrower but this behavior also demonstrates that farming need not be—and is not—a life-time career path for all entrants. Gale estimates a 3.5 percent annual exit rate for farmers from 1992 to 1997. Also, for the majority of participants, FSA Direct Loans do not appear to lead to a lifetime of using FSA Direct Loans. So the Direct Loan Programs appear to be serving as transitional sources of credit. Moreover, FSA borrowers transitioned to conventional sources of credit and a small proportion of farmers ended up having to leave farming involuntarily, e.g., due to financial stress. The reasons why one particular borrower leaves via one option instead of another is explored in the next section.

2.3. Modeling FLP Program Exit Status Using Multinomial Logit

The analysis above indicates the variety of ways borrowers could exit direct FLPs. To understand why borrowers exit in a given way, a multinomial logit model is estimated below to identify the relevant variables known at time of origination that can predict the type of outcome. Such information is useful to help FSA better predict outcomes. In general, FSA is interested in providing direct loans to farmers who can use them to move to conventional credit sources in due time, i.e., graduate. The analysis below identifies indicators of whether a borrower is likely to: remain a longer term client, encounter payback problems, continue in farming, or leave voluntarily for some other occupation.

2.3.1. Logit Model Methodology

The statistical model estimated is called a multinomial logit model. Logit models classify observations into various outcomes as a function of independent variables associated with each observation. For each observation there are eight outcomes—the seven forms of exit in table 2.9 plus the outcome of still being an active FLP participant. There are theoretical and practical reasons for combining the outcomes into four categories. The practical considerations include having a sufficient number of observations for each category to allow for reliable statistical inference. Also, a large number of categories would make for an unwieldy number of parameters that would make parameter interpretation difficult. On a theoretical level, logit models require the independence of irrelevant alternatives (IIA) (Greene, 2003). This theoretical property requires that the different categories be distinctly different from each other. For example, the two outcomes, exiting from direct OL, FO, and EM loans and continuing farming with guaranteed loans or continuing with regular commercial loans, are clearly much more similar than exiting farming involuntarily.

In a logit model with four outcome categories, three groups of parameters are estimated. Each parameter group indicates how a particular set of independent variables changes the odds of a particular outcome relative to a base outcome. Denote P_{ij} as the probability that the i^{th} farmer will experience outcome j (j = 1, 2, 3 ,4). Let j = 1 be the base outcome of still having one or more FO, OL, or EM loans. Thus we define P_{i1} as the probability that the i^{th} farmer will still be in the Direct Loan Program with one or more FO, OL, or EM loan(s). The parameters estimated for group j, call them βj, exert their effect on the probabilities, P_{ij} and P_{i1}, through the equation:

$$\ln(P_{ij} / P_{i1}) = \beta_j x_i \qquad j = 2,3,4$$

where ln denotes the natural logarithm. This equation reveals the impact of how characteristics of borrower i, x_i, affect the log of the ratio of the probabilities.

The parameters in the β_j are difficult to interpret in any meaningful way. A clearer presentation and interpretation of the coefficients can be obtained by using the coefficients to estimate changes in the probability of an event for a one-unit change in an independent variable. The formula for this is given in Greene (2003). Moreover, standard errors for these statistics can also be computed to determine if effects are statistically different from zero. These changes in probabilities are referred to as the marginal probabilities.[50]

An important characteristic of the estimated marginal probabilities as opposed to the estimated parameters (the β_j) is that some variables may be statistically significant in the estimated marginal probabilities that are not significant as parameters. Moreover, the number of estimated marginal probabilities exceeds the number of estimated parameters by one third. So if there are eighteen independent variables (including a constant) in the three-group system there will be fifty-four estimated parameters and seventy-two estimated marginal probabilities.[51]

The interpretation of the marginal probabilities as marginal changes is strictly applicable only to independent variables that are continuous over some interval of the observations. Seven of the independent variables in the estimated logit model are binary variables that indicate the presence or absence of some attribute. For example, the variable FO has a value of one if the loan was an FO loan; and the variable FEMALE takes on a value of one if the borrower is female. For binary variables, the marginal probabilities cannot be strictly interpreted as marginal changes since the variable can only change from zero to one. The appropriate procedure to compute the change in probability resulting from a change in the

[50] To evaluate the probabilities, it is necessary to set the values of the independent variables at some level. In this study the independent variables are set at their sample means.
[51] Given the excess of the number of marginal probabilities over the number of parameters, the probabilities associated with a given variable are required to sum to zero.

binary variable is to compute the probability of a particular outcome with the binary variable set to one and then subtract the probability with the binary variable set to zero. This is typically done with the other independent variables set equal to their sample means. These probabilities were computed for the seven binary variables. The standard errors for these estimated probabilities were computed using a bootstrap approach.

As with classical regression models, it is useful to compute measures of goodness of fit. Unfortunately there are not a series of goodness of fit statistics with interpretations as clear as those of the classical regression model. There are tests equivalent to the standard F test testing the null hypothesis that all the coefficients are equal to zero. In addition, there are prediction tests that measure how accurately the estimated model is able to predict the classification of the sample observations into their actual (observed) categories. This is computed using an actual versus predicted table. The usual style is to have the actual observations as the rows and the predictions as columns. In a perfect model, each observation would be classified in its correct category and the resulting table would be diagonal.

2.3.2. Modeling Issues

The model estimated and presented below is an incomplete model in a statistical sense. All independent variables are functions of data observable at origination. The dependent variable is the exit status at a later date. A complete model for explaining exit status would incorporate data on variables related to actual events in the intervening years. For example, in explaining exit status it would be useful to know the actual cash flows experienced by the borrower, and any emergencies or changes such as divorce, off-farm employment, or long-term illness that may have been experienced by the borrower.[52] All these factors and other post origination factors influence exit status. In a pure econometric sense, the models estimated are lacking all the relevant variables to explain exit status because relevant post origination variables are excluded. But the purpose of the models is to answer the following question: Are there variables at time of origination that can be used to help in determining a borrower's future exit status? The answer to this question helps FSA to be more selective in identifying borrowers most likely to benefit in the long run from direct loans. As a consequence, the finding that plausible predictive variables are statistically insignificant is not a failure in modeling or theorizing, but recognition that post-origination factors explaining exit status are important determinants of borrower status.

2.3.3. Empirical Model Specification

The empirical model was specified with the goal of including those explanatory variables most likely to predict which borrowers exited the program and how they exited. The explanatory variables are those observed during the loan approval process. This is the only information FSA has when evaluating a potential borrower. The purpose of the logit model is to determine which variables are most important in predicting the long-term "success" of the borrower without information on the events between origination and exit.

Outcomes for the model are classified into four categories. In the first category are those borrowers who were still FSA debtors as of November 30, 2004. We were furnished data from FSA in St. Louis on three variables that were used in making this determination. These variables were the number of OL, FO, and EM loans, respectively, outstanding as of November 30, 2004. If a borrower had zero outstanding loans in each of the three variable types, the borrower was classified as having exited the program, otherwise the borrower was considered to be still active in FSA FLPs, which we label as outcome one. If

[52] In a study of individual consumer bankruptcies, Sullivan, Warren, and Westbrook found loss of job or major medical event precede a consumer bankruptcy filing.

the borrower had exited FSA Direct Loan Programs, the borrower was put into one of three other categories on the basis of which of the seven exited classes was indicated by the FLM.

Three of the exit possibilities were that the borrower: (1) had graduated to FSA guaranteed credit, (2) had graduated to conventional credit, or (3) had graduated and was still in farming and did not need credit. For the purposes of logit estimation, these three outcomes were categorized together into outcome two (graduation). This category represents farmers who have been successful and were still in farming. The next category, outcome three, contains those who had left farming voluntarily or retired. This grouping represents those who left farming, but not under duress. Outcome four contains those who left farming involuntarily other than death. Farmers who died were not included in any of the four categories including "unknown." There were 63 such farmers out of the 2,705 farmers whose exit status was reported.[53] There was no natural category among the four created for those farmers who had died. The deceased farmers could have been put into a category of their own but then the specification of the economic and demographic variables (except for age) would not have made much sense.[54] Essentially, the results show that for the loans with borrowers of the ages sampled, two percent of the loans had borrowers who exited because of death about nine years later.[55]

The reduction from eight possible categories to four is justified for several reasons. First, it is important in logit models to avoid the problems with the independence of irrelevant alternatives (IIA) property as discussed previously. This essentially means the various outcomes should be distinct from all other outcomes.[56] The proposed groupings satisfy this requirement in the estimated model. Further, statistical tests of the IIA assumption indicate the assumption cannot be rejected.

The independent variables are grouped into four categories: (1) borrower demographics, (2) characteristics of the current loan, (3) prior financial distress and involvement with FSA Direct Loans, and (4) borrower financial characteristics. An exact description of the variables is given in table 2.10. The demographic variables are age (AGE), race (RACE), and gender (FEMALE). The characteristics of the current loan include whether the loan is FO, OL, BF, or SDA. These three variables are binary and take on the value of 1 if the loan has the particular characteristic. Also included is the number of weeks elapsed (WEEKELAP) since origination of the loan and November 22, 2004, the beginning day of the survey. As time elapses, it would be expected the borrower would be more likely to leave the direct FLP.

The binary variable (FINDIS) indicates the borrower had been in receivership, received a bankruptcy discharge, or petitioned for bankruptcy reorganization prior to the loan application. This is included as a measure of prior financial distress. Also included are the number of active FO loans at time of application (NUMFO) and similar measures for number of OL loans (NUMOL) and number of EM loans (NUMEM).

[53] There were ten observations for which no status—including unknown—was reported.
[54] A simple binomial logit model was estimated with the dependent variable equaling one if the borrower was still alive at the time of the survey and zero if deceased. With age as the sole independent variable, the coefficient on age was significant and negative as expected. An exit by death can also be viewed as a missing observation in the sense that it is not really known what becomes of the loan. The survivors might continue farming in their own right and get a new loan to continue farming. The new loan could be direct, guaranteed, or conventional. Likewise, the heir might continue farming without any loans at all. Finally the decedent may have been in precarious financial condition and have exited farming soon had he/she continued to live.
[55] In computing the two percent figure, it was assumed that if a borrower exited because of death, the FLM would know that. If the FLM indicated "unknown" for exit reasons, the borrower was almost certainly alive at the exit time.
[56] The classic example (Judge et al.) is predicting whether a child chooses to receive a pony or a bicycle as a gift. If the choice set were expanded to include a pony, a blue bicycle or a red bicycle, the IIA assumption would be violated. That is, two of the outcomes—the two bicycles differing only by color—are sufficiently alike and both differing from the pony in essentially the same way, that an underlying construct of the logit model is violated. In such a case the estimated logit model would be of questionable value.

Table 2.10. Logit model variable definitions

Dependent variable is EXIT	
	EXIT = 1 if borrower has active direct OL, FO or EM loans as of November 30, 2004, EXIT = 2 if borrower has no active direct OL, FO or EM loans and is still farming using conventional sources of credit or no credit at all, EXIT = 3 if borrower has no active direct OL, FO or EM loans and left farming voluntarily or retired, EXIT = 4 if borrower has no active direct OL, FO or EM loans and left farming involuntarily (other than death).
Independent variables	
AGE	Age in years of the operator at time of loan application,
RACE	Binary variable taking on a value of 1 if borrower not white, 0 otherwise,
FEMALE	Binary variable with value of 1 if borrower female, 0 otherwise,
FO	Binary variable with value of 1 if loan FO, 0 otherwise,
OL	Binary variable with value of 1 if loan OL, 0 otherwise,
BF	Binary variable with value of 1 if loan has a beginning farmer assistance code, 0 otherwise,
SDA	Binary variable with value of 1 if loan has a socially disadvantaged assistance code, 0 otherwise,
FINDIS	Binary variable with value of 1 if borrower has ever been in receivership, discharged in bankruptcy or petitioned for reorganization under bankruptcy,
WEEKLAP	Number of weeks since loan origination date to November 22, 2004,
NUMEM	Number of active EM loans at time of loan application,
NUMOL	Number of active OL loans at time of loan application,
NUMFO	Number of active FO loans at time of loan application,
DA	Total liabilities divided by total assets,
NETWORTH	Net worth in millions of dollars,
NFINTCFI	Non-farm income divided by total cash farm income,
REPAY	Balance available for debt service divided by total debt service due that year,
TOTINC	Total annual household net cash income in millions of dollars.

The financial variables are measured at the time of loan application. The debt-to-asset ratio (DA) is defined as total debts divided by total assets. Both farm and non-farm debts and assets are included in the computation. The greater the DA, the more likely the farmer is to be both financially stressed and/or still be in the program at a later date. Net worth (NETWORTH) is computed as total assets less total liabilities in millions of dollars.[57] The ratio of off-farm income to total cash farm income sources (NFINTCFI) is a measure of income diversification as well as the ability to generate income to offset financial shortfalls from farming. Repayment ability is measured as the balance available for debt service divided by total debt service due that year (REPAY). The final variable (TOTINC) is total annual household net cash income in millions of dollars. Borrowers with higher repayment ability and income

[57] Millions are used to facilitate convergence in maximizing the likelihood function and to keep the coefficients from becoming comparatively minute.

should graduate from FSA Direct Loan Program earlier than borrowers at lower levels of these variables.[58]

2.3.4. Analysis of Estimated Model

The estimated model yields a number of statistically significant marginal probabilities as displayed in table 2.11. The overall fit of the model can be appraised in three dimensions. As mentioned earlier, the IIA assumption cannot be rejected. Furthermore, the likelihood ratio statistic measuring the overall significance of the coefficients firmly rejects the hypothesis that the coefficients of all the variables simultaneously equal zero. The model included 1,928 observations. This is less than the 2,715 surveyed but an observation was included only if it had valid entries for all variables in the logit model for a given loan.

The percent of sample observations predicted correctly by the model is disappointing. Although 57 percent of the observations are correctly predicted, this is not much better than simply predicting all of the observations as being in the category of borrowers who are still paying on direct loans. The problem is likely the disproportionate number of observations in the outcome categories. In the sample used to estimate the logit model there were 1,928 observations and 1,092 were from borrowers who still had active FSA loans. Of the remaining observations, 456 had graduated to non-direct loan credit or no longer needed credit, 273 had voluntarily left farming, and 107 had involuntarily left farming.[59] Thus the estimated model tends to classify each observation as being in the category with the most observations—not exiting the program in this case.

The lack of predictive power also underscores the point made earlier that events subsequent to origination play a major role in the financial well-being of FSA borrowers as with any borrower involved in agricultural production. From 1994 to 2004, some years were generally good and some were weaker, particularly from 1998 to 2002 in terms of net farm income. Almost all FSA borrowers are at the financial margin although some are financially stronger than others. As we discuss shortly, there are indications of this payback ability differential at origination. But these indications are not clear enough to be blatant signals that certain borrowers should be denied credit. This suggests that in the application process, FSA is using available information to deny credit to obvious credit risks.[60]

Even though the weak predictive performance of the model can be partially explained in terms of the unbalanced sample, it must be also recognized that this indicates a lack of strong explanatory power in the model. If there were explanatory variables that varied distinctively by outcome category, then the predicted versus actual would have better explanatory power. So in evaluating the model, it is fair to say that there is some explanatory power but not sufficient power to give highly accurate predictors of exit status. As discussed earlier, events subsequent to loan origination are likely more powerful predictors. It is the uncertainty of these events that makes for the inherent risk in lending.

The marginal probabilities show largely predictable effects. The analysis here focuses exclusively on those variables statistically significant at the 0.05 level on a

[58] An alternative specification approach would be to use a credit scoring index. Such an index is the weighted value of various variables measuring borrower characteristics. Splett et al. use measures of liquidity, solvency, profitability, repayment capacity, and financial efficiency. Two of the variables in the estimated model, DA and REPAY, could be included in a credit score. Additional variables to measure liquidity, profitability, and financial efficiency were tried in preliminary estimation but their estimated parameters were not significant. Three other variables were included in the model during preliminary estimation. These were 1) whether the loan term was one year or seven years for OL loans, 2) whether the borrower had been in receivership, discharged in bankruptcy or filed for bankruptcy reorganization, and 3) the proportion of gross farm income from crops. All three of these were insignificant and subsequently deleted from the model in the interest of parameter parsimony.

[59] In particular, missing observations were a problem for those exiting the program. If the FLM did not know the reason for exit, they could mark "unknown".

[60] The evidence does not *prove* but is only suggestive. "Proof" would require granting loans to weak applicants to discover if they do fail at markedly higher rates than the applicants receiving loans.

Table 2.11. Estimated marginal probabilities for logit model of exit status

Marginal probabilities of still active FSA borrower [EXIT = 1]				
Variable	Coefficient	Standard error	t-ratio	p-value
Constant	0.6692	0.1421	4.71	0.00
AGE	-0.0034	0.0011	-3.04	0.00
RACE	0.1537	0.0481	3.20	0.00
FEMALE	0.0292	0.0444	0.66	0.51
FO	0.1382	0.0446	3.10	0.00
OL	0.0177	0.0346	0.51	0.61
BF	-0.0768	0.0369	-2.08	0.04
SDA	-0.0348	0.0673	-0.52	0.61
FINDIS	-0.0778	0.0546	-1.43	0.15
WEEKELAP	-0.0008	0.0002	-3.34	0.00
NUMEM	0.0545	0.0140	3.89	0.00
NUMOL	0.0247	0.0079	3.11	0.00
NUMFO	0.0698	0.0167	4.19	0.00
DA	0.0720	0.0320	2.25	0.02
NETWORTH	0.0824	0.0790	1.04	0.30
NFINTCFI	-0.0018	0.0091	-0.20	0.84
REPAY	0.0157	0.0174	0.90	0.37
TOTINC	-0.0945	0.1526	-0.62	0.54

Marginal probabilities of continued farming with or without conventional credit [EXIT = 2]				
Variable	Coefficient	Standard error	t-ratio	p-value
Constant	-0.1676	0.1226	-1.37	0.17
AGE	0.0002	0.0010	0.17	0.86
RACE	-0.1076	0.0419	-2.57	0.01
FEMALE	-0.0703	0.0389	-1.81	0.07
FO	-0.0429	0.0388	-1.11	0.27
OL	-0.0320	0.0318	-1.00	0.31
BF	-0.0072	0.0300	-0.24	0.81
SDA	0.0086	0.0672	0.13	0.90
FINDIS	0.0015	0.0471	0.03	0.97
WEEKELAP	0.0004	0.0002	2.03	0.04
NUMEM	-0.0273	0.0131	-2.09	0.04
NUMOL	-0.0336	0.0076	-4.39	0.00
NUMFO	-0.0261	0.0153	-1.71	0.09
DA	-0.1157	0.0348	-3.33	0.00
NETWORTH	0.1749	0.0583	3.00	0.00
NFINTCFI	0.0160	0.0058	2.77	0.01
REPAY	0.0084	0.0089	0.95	0.34
TOTINC	0.0743	0.0908	0.82	0.41

Marginal probabilities of voluntarily leaving farming or retirement [EXIT = 3]				
Variable	Coefficient	Standard error	t-ratio	p-value
Constant	-0.3779	0.0998	-3.79	0.00
AGE	0.0040	0.0007	5.48	0.00
RACE	-0.0679	0.0246	-2.76	0.01
FEMALE	0.0385	0.0291	1.32	0.19
FO	-0.0749	0.0211	-3.55	0.00
OL	0.0017	0.0235	0.07	0.94
BF	0.0948	0.0365	2.59	0.01
SDA	0.0479	0.0500	0.96	0.34
FINDIS	0.0343	0.0259	1.32	0.19
WEEKELAP	0.0002	0.0002	1.16	0.24
NUMEM	-0.0252	0.0101	-2.50	0.01
NUMOL	0.0063	0.0049	1.29	0.20
NUMFO	-0.0135	0.0111	-1.22	0.22
DA	0.0367	0.0165	2.23	0.03
NETWORTH	-0.1143	0.0697	-1.64	0.10
NFINTCFI	-0.0083	0.0084	-0.98	0.33
REPAY	-0.0198	0.0215	-0.92	0.36
TOTINC	0.0082	0.0946	0.09	0.93
n	1929			
χ^2	288	p-value	0.000	

Marginal probabilities of involuntarily leaving farming other than death [EXIT = 4]				
Variable	Coefficient	Standard error	t-ratio	p-value
Constant	-0.1237	0.0453	-2.73	0.01
AGE	-0.0007	0.0004	-2.03	0.04
RACE	0.0219	0.0310	0.71	0.48
FEMALE	0.0026	0.0137	0.19	0.85
FO	-0.0204	0.0095	-2.16	0.03
OL	0.0125	0.0102	1.23	0.22
BF	-0.0108	0.0091	-1.18	0.24
SDA	-0.0218	0.0099	-2.19	0.03
FINDIS	0.0420	0.0209	2.01	0.04
WEEKELAP	0.0002	0.0001	2.60	0.01
NUMEM	-0.0020	0.0044	-0.45	0.65
NUMOL	0.0026	0.0021	1.25	0.21
NUMFO	-0.0303	0.0074	-4.09	0.00
DA	0.0070	0.0064	1.10	0.27
NETWORTH	-0.1430	0.0399	-3.58	0.00
NFINTCFI	-0.0059	0.0056	-1.05	0.29
REPAY	-0.0043	0.0084	-0.52	0.60
TOTINC	0.0120	0.0179	0.67	0.50

two-sided test (p-values ≤ .05). Category 1 (EXIT = 1) is of particular interest since it indicates borrowers are still holding one or more direct loans. The older the borrower at time of origination, the less likely they are to still be in the Direct Loan Program. However, the effect is not large since one more year only increases the probability of exiting by 0.003. So a ten-year difference would only alter the probability by three percent. Non-white borrowers are more likely to remain in FSA FLPs. Non-white, as opposed to white borrowers, have a 15 percent higher probability of still having an FSA loan. Receiving an FO loan indicates a 14 percent higher probability of still being in the program. This is to be expected since FO loans are longer term. Also, to the extent that the interest rate is low relative to current market interest rates, there is not a strong incentive for farmers to terminate the loan. Furthermore, a majority of the FO borrowers are beginning farmers; and the interest rates for BF FO down-payment loans were 4.0 percent during FY 1994–1996, which was lower than market rates at the time (USDA/ERS, 1994). Thirty-eight percent of the FO loans in the sample were down-payment loans. Beginning farmers are less likely to remain in the programs. As discussed earlier, these may be younger farmers finding that farming is not as attractive as other opportunities they could pursue.[61]

Not surprisingly, the longer the time since loan origination, the less likely a borrower is still to be in the program. This indicates that borrowers tend to leave FSA FLPs with the passage of time. Nonetheless, some borrowers undoubtedly do stay for long periods of time. All three variables representing the number of FO, OL, and EM loans outstanding at time of loan origination have the expected positive signs. Borrowers who hold multiple loans are more likely to stay in the Direct Loan Programs. Even though there are limits on the total FSA debt a borrower can hold at any point in time, a large number of loans may be a proxy for overall financial weakness. That borrowers with multiple loans are less likely to exit is not surprising. But this fact does raise the important policy issue of whether there should be a limit to the number of loans—particularly FO and OL loans—any one borrower can have at a given time. The estimated marginal effects of 0.05 for EM, 0.02 for OL, and 0.07 for FO loans indicate that this effect is important. For example, a borrower with two OL loans and one FO loan at the time of originating a new FO or OL loan would be approximately 11 percent more likely to still be active in the FSA Direct Loan Programs than a borrower originating a new FO or OL loan with no other active direct loans.

The final significant variable for not exiting is the debt-to-asset ratio, DA. It has an expected positive sign indicating that weaker solvency at origination increases the likelihood of remaining in a Direct Loan Program. However, the effect is not large. In the estimation sample, DA has a mean of 0.67. A one-unit increase would take the ratio to 1.67 and, correspondingly, a 7.2 percent increase in the probability of remaining in direct FLPs as indicated by the 0.072 marginal probability. However, for small increases in DA, the altering of the probability of remaining in the program is small.[62]

The significant marginal probabilities of continuing farming with or without conventional credit (EXIT = 2) share some variables in common with the likelihood of remaining in the program. Numbers of outstanding OL and EM loans have a negative effect on graduation as does DA. The signs on NUMOL and NUMEM, which are negative, are consistent with the findings for the probability of remaining in the program. Increased solvency at loan origination makes it more likely the borrower will graduate from the Direct Loan Program. A further confirmation of this financial characteristic effect is the positive sign on NETWORTH. The larger the ratio of non-farm

[61] While all FO down-payment loans go to beginning farmers, the majority of beginning farmer loans were OL.
[62] For example, if DA increased from 0.3 to 0.6, then the probability of remaining in the program would increase by approximately two percent.

income to total cash farm income at loan origination, the greater the likelihood of graduating. So solvency, equity, and non-farm income are indicators of likely success. RACE is a significant variable, and it is negative. The effect is substantial because the estimated coefficient, -0.1076, indicates that being a member of a non-white racial group means the probability of graduating declines by nearly 11 percent. Finally, the longer the time from origination, the more likely the borrower is to graduate.

Significant variables influencing the probability of leaving farming voluntarily or retiring (EXIT = 3) include demographic- and loan-type variables. Age is highly significant but its coefficient is small. The fact that "retired" is included in this category is probably a deciding factor in making the coefficient positive. It could also be argued that younger farmers who perceive they have alternative job opportunities to farming might leave early while they still have time to realize the benefits of an alternative career. However, this argument is inconsistent with the positive sign of the age coefficient. The FO coefficient estimates a seven percent decrease from originators of EM or OL loans of voluntarily leaving farming or retiring. Recipients of BF loans are nine percent more likely to exit voluntarily than their non-BF counterparts.

Increasing numbers of EM loans at loan origination are also negatively associated with being in the *voluntarily left* farming category. This makes sense because such farmers are already saddled with debt via the EM loans so they are less likely to become free of additional debt. Finally, less initial solvency as evidenced by a greater debt-to-asset ratio at time of borrowing indicates an increased likelihood of leaving farming voluntarily. This is not unexpected since such farmers were in weaker financial condition at the beginning of the loan and may have decided the likelihood of achieving success via farming was too small and thus left farming.

Those leaving farming involuntarily other than death (EXIT = 4) are affected by an interesting set of factors. Somewhat surprisingly, age is negatively related, suggesting that experience may be a factor in being financially successful. Borrowers who received FO loans were less likely to have left involuntarily. Farmers receiving FO loans, which are relatively longer-term loans, may be required to be in a relatively stronger financial position and have more experience than farmers qualifying for other FSA Direct Loans, as is implied by some of FSA's policies. Also, farmers with FO loans own real estate. It is generally considered that farmers are more personally attached to real estate, particularly if it has been in the family for a while, than non-real estate. Therefore, farmers are more likely to do more to keep from losing their farmland. This finding for FO is consistent with the number of FO loans at time of origination being negatively related to leaving involuntarily. Thus a borrower with multiple FO loans and, perhaps, more farmland equity, is less likely to leave involuntarily. Also a borrower with a number of FO loans originating at different points in time has gained more experience and the FLM may have developed a better information base from which to make a loan decision.

Borrowers originating SDA loans have lower probabilities of leaving involuntarily. SDA farmers have lower mean farm assets and essentially equal non-farm income. Perhaps because they have less invested in farming and equivalent income prospects, such farmers might be more inclined to leave voluntarily as financial prospects from the farming operation decline. The coefficient of time since origination is positive, implying that being in the program longer can be an indication of distress.

Two other variables, FINDIS and NETWORTH, are significant in the probability to leave involuntarily. The variable FINDIS is binary indicating, the borrower had experienced prior financial hardship by virtue of having been in receivership, discharged in bankruptcy, or having petitioned for reorganization

under bankruptcy. Given the positive coefficient of FINDIS, the history of past financial difficulties to the extent of having past bankruptcy actions indicates a four percent greater likelihood of distress in the future. In addition, increasing net worth at time of loan origination implies that financially stronger borrowers are less likely to leave Direct Loan Programs involuntarily. An implication of this finding, which is consistent with an earlier finding, is that lowering the financial requirements of borrowers would lead to lower graduation rates.

Results from the logit model are largely as expected. Borrowers with strong financial backgrounds—lower debt-to-asset ratio, higher net worth, and more nonfarm income relative to gross cash receipts—are more likely to graduate from FSA FLPs. This is expected but also serves as a warning that lowering eligibility requirements could lead to longer stays in Direct Loan Programs and more voluntary/involuntary exits from farming. Older borrowers are more likely to leave the programs and this may be through retirement.

2.4. Borrower Progress Measured by Changes in Financial Characteristics

Borrower financial progress can also be examined by measuring changes in borrower financial characteristics over time. In this section, borrower financial progress is measured by three variables. In the survey, observations on the most current borrower net worth and debt-to-asset ratio, and farm-level current ratio were collected with the date of the observation on these variables.[63] In the survey the FLMs were not tied to a specific data source. It was anticipated these values would typically come from the latest Farm and Home Plan. But if the FLM had a more recent, reliable source than the latest Farm and Home Plan, those figures could be reported. The response rates on these three variables were 71, 57, and 65 percent, respectively. Financial progress is indicated by an increased net worth. While an increasing current ratio and decreasing debt-to-asset ratio would also seem to indicate financial progress, farmers earlier in their careers can take on additional debt to build the size of their operation and perhaps capture economies of size. Nonetheless, strong, adverse movements in these two variables are not positive indications.

2.4.1. Measuring Change

The changes in net worth, current ratio, and debt-to-asset ratio are measured in similar ways. It is necessary to measure the change on a per-unit-of-time basis. This is required because the length of time between the measurements for each loan is different so that comparisons must be standardized for a given unit of time, in this case years. For example, a change in net worth from $5,000 to $10,000 over one year is much different than the same absolute change over four years. It is not possible to get meaningful, annual percentage changes for net worth because in the sample, net worth can go from positive to negative or vice versa. Since current and debt-to-asset ratios are always non negative by definition, a similar problem is not encountered. It is possible to compute a percentage change in such ratios but, even if outliers are eliminated, the dispersion of percentage changes is so great as to make computed annual percentage changes highly susceptible to a few extreme values.

The measure of change used for net worth, current ratio, and debt-to-asset ratio is the average annual change. This is computed by subtracting the original value of the variable from its most current value and then dividing the difference by the number of years between the two observations. For example, net worth at origination is subtracted from the latest net worth reported in the survey. This difference is then divided by the number of elapsed years from loan application to when the most recent net worth was

[63] Net worth and debt-to-asset ratio measured at the borrower level instead of farm level since they are better measures of overall borrower financial progress. Current ratio is measured at the farm level since the Farm and Home Plans did not have sufficient data to compute borrower-level current ratio.

observed. Similar computations are done for current ratio and debt-to-asset ratio.

All three measures of financial well-being have flaws. The most troublesome is the timing issue. Both the original values and the subsequent values are not typically measured at the same point in their respective years. This can be crucial in making comparisons. Current ratio is especially sensitive. For example, at planting time a current ratio is likely to be lower than when the crop has been harvested, sold, and operating loans paid back. Debt-to-asset ratio can also fluctuate by time of year although it typically is a much longer term measure since it includes long-run items such as land and land mortgages. Net worth can also vary by time of year due to the impact of short-term debt and when product is sold.[64]

All three measures are also influenced by events external to the FLPs. Land values, product prices, production costs, yields, interest rates, and non-farm-related economic events influence all three of these variables. In the U.S. from 1995 to 2003, per-farm farm net worth grew by $22,500 a year and the farm debt-to-asset ratio for the U.S. went from 14.8 percent to 14.4 percent over the same time span.[65] Using ARMS data, the estimated farm current ratio in 1996 was 2.94 for all farms and in 2003 the corresponding figure was 2.96, implying essentially no change over time.[66]

In the following sections these variables—despite their flaws—are used as approximate measures of financial progress. A more detailed analysis interviewing borrowers directly would likely give a more comprehensive picture of financial progress over time and be able to identify whether changes in financial progress were due to participation in FSA programs or to other factors. In the absence of such analysis, the following statistics and models give an approximate description as to level of financial progress and sources of such progress.

2.4.2. Outlier Observations

Outlier observations were a problem for net worth and current ratio. For four of the 1,794 observations on change in net worth, the annual change was greater than $300,000 or less than -$300,000. Such changes seem implausible and more likely due to a data entry error than an extreme reversal of net worth.[67] These four observations were deleted from the models. As a result the mean annual change in net worth went from $8,674 to $9,573. Similar anomalies occurred with the current ratio. It was possible to compute the annual change in current ratio for 1,426 observations. When it was further required that no reported current ratio be 10 or greater, the number of valid observations fell by 32 to 1,394. This changed the mean annual current ratio change from -0.17 to approximately 0.01. A similar cleaning is done for the debt-to-asset ratio eliminating three observations with debt-to-asset ratios greater than or equal to 10, but the difference in the mean annual change in debt-to-asset ratio was minimal.

2.4.3. Empirical Results: Change in Net Worth

As reported in table 2.12, the estimated mean annual change in net worth was $9,573 per year and this estimate is statistically significant at 0.05 based on 1,790 observations. So borrowers are strengthening their overall equity. However, the mean changes in net worth vary substantially across loan categories as is clearly seen in table 2.12 although many of the pairwise comparisons are not significantly different. Some of the differences in net worth may be attributable to factors other than loan type. To explore this, a regression model was estimated with annual change

[64] One solution to the time problem would be to use only observations where the observation dates were approximately some integer number of years apart. Unfortunately, this would result in losing most of the sample observations and then basing conclusions on small samples.
[65] http://www.ers.usda.gov/Data/farmbalancesheet/fbsdmu.htm. Accessed May 20, 2005. Data for 2004 were not available.
[66] http://www.ers.usda.gov/data/arms/app/FarmResponse.aspx. Accessed May 20, 2005. No data were available for 1995.
[67] An inheritance could justify a large increase in net worth just as a sudden decrease in asset values such as a drop in stock prices could result in a large decrease in net worth. We think a data entry error or incorrect computations by the applicants are a more likely explanation.

Table 2.12. Loan activity and financial progress of FY 1994–1996 farm loan program borrowers

	OLREG	OLBF	OLBFSDA	OLSDA	FOREG	FOBF	FOBFSDA	FOSDA	EM	Total
N (number of FY 1994–1996 loans by assistance code)	23,557	6,351	1,139	2,979	660	1,728	339	356	8,359	45,468
n (number of observations)*	1,218	318	102	287	73	169	33	28	487	2,715
Mean borrower's net worth at time of loan origination	118,009 (5,834)	54,704 (13,660)	45,221 (6,583)	94,488 (10,394)	115,959 (19,551)	69,771 (6,791)	46,554 (6,763)	124,056 (32,888)	196,057 (19,216)	116,307 (4,852)
Mean annual level of change in net worth	9,716 (1,198)	7,794 (2,225)	2,427 (5,985)	-2,916 (3,467)	14,885 (3,986)	18,378 (2,042)	3,067 (7,268)	12,340 (17,989)	10,359 (3,321)	9,573 (921)
Borrower's current ratio at time of loan origination	1.8 (0.313)	1.6 (0.645)	1.6 (0.781)	1.1 (0.146)	2.2 (0.635)	2.9 (0.677)	1.5 (0.583)	1.9 (0.998)	1.1 (0.223)	1.7 (0.181)
Mean annual level of change in current ratio	0.016 (0.019)	-0.036 (0.037)	-0.073 (0.067)	-0.040 (0.053)	0.095 (0.092)	-0.057 (0.097)	-0.246 (0.310)	0.057 (0.093)	0.026 (0.018)	0.007 (0.014)
Borrower's debt/asset ratio at time of loan origination	0.743 (0.019)	0.604 (0.034)	0.577 (0.038)	0.619 (0.025)	0.608 (0.033)	0.384 (0.026)	0.723 (0.209)	0.919 (0.392)	0.773 (0.075)	0.690 (0.017)
Mean annual level of change in debt/asset ratio	0.035 (0.015)	0.083 (0.018)	0.159 (0.067)	0.129 (0.068)	0.001 (0.005)	0.131 (0.045)	0.115 (0.134)	0.008 (0.031)	0.108 (0.113)	0.067 (0.021)

Source: Computed from 2004 Survey of FY 1994–1996 New Loans
*Statistics in a given column may be based on fewer observations if there are missing values. Standard errors are in parentheses.

in net worth (DNETWORTH) regressed on borrower age, race, gender, loan type (FO, OL, or EM), whether the loan was beginning farmer (BF) and/or SDA, and four variables measuring financial characteristics at origination. These variables were: (1) whether the borrower had previously been financially distressed in the form of receivership or bankruptcy (FINDIS), (2) net worth (NETWORTH), (3) non-farm income (NONFMINC), and (4) gross total cash farm income (TCFI). All four variables were observed at origination. The variable FINDIS indicates potential financial problems given past financial difficulty. Net worth controls for the size of increase in the sense that the magnitude of change is likely to be related to initial starting point. Non-farm income is independent of farm income and the primary source of net income for most farm operators. Finally, TCFI adjusts for the magnitude of changes in net worth since larger changes would typically only be associated with higher levels of gross revenues.

The model was estimated with least squares but analysis of the residuals showed significant heteroscedasticity. In such a case conventional least squares inference is invalid and an alternative estimation technique must be employed. A robust solution to this problem is to estimate the regression coefficients by least squares but then estimate the standard errors of the coefficients by White's heteroscedasticity consistent estimator (White, 1980). This was the approach taken here.

Results of the regression model are displayed in table 2.13. The model has little explanatory power by virtue of the coefficient of determination being 0.019, which is low even for cross-sectional data. The most striking aspect of the regression results is the lack of statistical significance of all but one of the independent variables. This is somewhat surprising since one would at least think initial net worth or projected size of the operation as embodied in TCFI would be significant. Both coefficients of these variables are positive but clearly insignificant. The lack of significance indicates that changes in net worth are functions of events subsequent to loan origination.

The variable RACE is significant in the change in net worth equation. Its negative coefficient of $11,109

implies the annual change in net worth was $1,981 for non-whites. However, if the regression model is simplified by omitting all the statistically insignificant variables, then the annual change in net worth for non-whites becomes a negative $2,516, which indicates that non-whites in the program actually lost net worth. In comparing whites with non-whites, the negative $2,516 is the more reliable figure. A more intense study of non-white farmers observing what happens to them subsequent to originating a loan might shed light on reasons for this disparity.

2.4.4. Empirical Results: Change in Current Ratio

The next two measures of financial progress are measured as ratios. The two ratio models have the same independent variables. These models are constructed differently from the net-worth model where the dependent variable was measured in dollars. For current ratio and debt-to-asset ratio models, the dependent variables are changes in current ratio (DCR) and changes in debt-to-asset ratio (DDA). Regression model specification typically requires that the dependent variable and independent variables be of generally the same form (Kennedy, 2003). These include all of the binary variables in the net worth model[68] and four financial variables. These variables, as measured at loan origination, are debt-to-asset ratio (DA), current ratio (CR), ratio of non-farm income to total cash farm income (NFINTCFI), and ratio of balance available to pay debt to debt service due in the first year after the loan (REPAY). The intent of these variables is to measure the long-term solvency, current liquidity, reliance on non-farm income sources, and loan repayment capacity. These are key indicators in the loan decision process and should be good predictors of financial progress.

The annual average change in the current ratio of 0.01 is not statistically significantly different from zero as shown in table 2.12. Table 2.14 displays the current ratio model. This model fits much better than the net worth model with a coefficient of determination of 0.23. Two coefficients are statistically significant in this model. If the originating loan is FO then the average annual change in the current ratio is 0.2 greater than EM loans, *ceteris paribus*. The reason for this is not totally clear since FO borrowers can certainly have other types of FSA Direct Loans. Many FO borrowers are just beginning their careers relative to many EM borrowers and therefore would have relatively few current assets, potentially making the ini-

Table 2.13. Regression explaining variability of annual change in net worth

Dependent variable is DNETWORTH				
Independent variable	Coefficient	Standard error	t-ratio	p-value
CONSTANT	13,090	5,569	2.35	0.02
AGE	-100	87	-1.15	0.25
RACE	-11,109	5,205	-2.13	0.03
FEMALE	-2,960	4,977	-0.59	0.55
FO	7,348	4,395	1.67	0.09
OL	-1,160	3,467	-0.33	0.74
BF	-1,764	2,423	-0.73	0.47
SDA	-2,907	5,758	-0.50	0.61
FINDIS	-3,493	4,308	-0.81	0.42
NETWORTH	0.006	0.012	0.46	0.64
NONFMINC	13	86	0.15	0.88
TCFI	0.011	0.018	0.59	0.55
n	1,730			
F	3.08	p-value		0.00
R^2	0.019			
Adjusted R^2	0.013			

[68] Binary variables are appropriate for models where the dependent variable is in levels or ratios.

Table 2.14. Regression explaining variability of annual change in the current ratio

Dependent variable is DCR				
Independent variable	Coefficient	Standard error	t-ratio	p-value
CONSTANT	0.063	0.126	0.50	0.62
AGE	0.001	0.001	0.94	0.35
RACE	-0.121	0.071	-1.71	0.09
FEMALE	-0.108	0.109	-0.99	0.32
FO	0.195	0.076	2.57	0.01
OL	0.026	0.024	1.11	0.27
BF	-0.032	0.049	-0.66	0.51
SDA	0.057	0.094	0.61	0.54
FINDIS	0.037	0.053	0.71	0.48
DA	-0.050	0.027	-1.84	0.07
CR	-0.186	0.021	-8.91	0.00
PCTNFINC	-0.008	0.010	-0.74	0.46
REPAY	0.100	0.082	1.23	0.22
n	1,331			
F	33.45	p-value		0.00
R^2	0.233			
Adjusted R^2	0.226			

tial current asset ratio low. Note that receiving a BF-loan assistance type is not significant. Thus the enhancement in current ratio of the FO program is equally beneficial to BF and non-BF FO borrowers.

The current ratio at origination is also significant and has a surprisingly negative coefficient. At first glance it would seem borrowers with high initial current ratios should be in stronger financial condition so that current ratios should grow positively, implying the sign is counter intuitive. What is really happening here is that the way the model is structured gives a somewhat false impression. The variable CR is in levels and the dependent variable is in differences. The actual implication is likely that the more recent current ratio is related to past current ratio but with a coefficient less than one. When the differences are taken of the dependent variable, a negative sign arises for the initial level. What this implies is that other factors are helping to keep the current ratio from changing over time although these factors are not present in the model in a statistically significant sense. The model in table 2.14 is incomplete and does not include those events subsequent to loan origination that clearly affected changes in current ratios.

It is further important to note that none of the demographic or loan program variables are statistically significant in the current ratio model. This confirms that no one group of borrowers or loan assistance types are more or less likely to have a change in the current ratio. This result holds even if the model in table 2.14 is re-estimated without the four financial variables.

Two variables in table 2.14 have p-values between 0.05 and 0.10, suggesting near significance at 0.05. These are RACE and debt-to-asset ratio (DA). Race has a negative sign indicating that members of non-white racial groups are less likely to experience positive growth in their current ratios. Likewise, DA has a negative sign indicating that less solvent borrowers at origination are more likely to have less or negative growth in their current ratios. This is not surprising since increased debt (leverage) makes it more difficult for borrowers with low income, as many FSA borrowers have, to strengthen their financial characteristics.

2.4.5. Empirical Results: Change in Debt-to-Asset Ratio

The mean of the annual change in the debt-to-asset ratio (DDA) is 0.067 and it is statistically different from 0 at 0.05 as shown in table 2.12. This implies that the solvency position of borrowers becomes weaker over time. Typically this is not considered a positive result. However, to the extent that borrowers are relatively early in their careers, increases in debt-to-asset ratios are part of the life-cycle of farm operators, particularly in the early part of the life-cycle. It is during the early years that borrowers use debt to acquire assets and operating capital to build their enterprise.

Table 2.15 displays the results of a regression model to explain variability in the annual change of DA. The model has poor explanatory power with a coefficient of determination of 0.021. Initial debt-to-asset ratio (DA) is the only significant variable and it has a negative coefficient. As with the change in current ratio, the finding of a negative coefficient on the initial level of the change variable should be interpreted as saying that the later DA is related to the prior level with a coefficient less than one.

None of the other variables in the regression model are statistically significant. Repayment capacity has a p-value of 0.06 and a negative sign. As balances available to pay debt relative to debt service increase, the debt-to-asset ratio should decrease. The general lack of significant independent variables indicates events subsequent to origination are influencing the DA for borrowers. As with the other two measures of financial progress, the finding that subsequent events affect financial well-being is not surprising.

2.5. Summary

The most important findings in this section are that an estimated 78 percent of FSA Direct Loans in FY 1994–1996 terminated by the end of 2004 and that more than half the borrowers originating the loans during FY 1994–1996 exited the Direct Farm Loan Program. Loan termination was much more frequent for OL and EM loans than for FO loans. This was expected given the longer-term nature of FO loans. The 81 percent paid-in-full status for the 75 percent of terminated EM loans also indicates most EM borrowers were able to pay back loans despite experiencing a catastrophic event that precipitated the EM loan. Within a given loan type (FO, OL), being an

Table 2.15. Regression explaining variability of annual change in the debt-to-asset ratio

Dependent variable is DDA				
Independent variable	Coefficient	Standard error	t-ratio	p-value
CONSTANT	0.058	0.071	0.82	0.41
AGE	0.001	0.001	0.58	0.56
RACE	0.072	0.054	1.34	0.18
FEMALE	0.008	0.027	0.31	0.76
FO	-0.005	0.024	-0.23	0.82
OL	0.026	0.019	1.33	0.18
BF	0.032	0.020	1.55	0.12
SDA	-0.040	0.049	-0.83	0.41
FINDIS	0.005	0.040	0.14	0.89
DA	-0.097	0.029	-3.37	0.00
CR	0.001	0.001	0.70	0.48
PCTNFINC	0.004	0.005	0.76	0.45
REPAY	-0.019	0.010	-1.85	0.06
n	1,168			
F	2.04	p-value		0.18
R^2	0.021			
Adjusted R^2	0.011			

SDA or beginning farmer did not have a substantial impact on loan termination rate. Also encouraging was that most of the loans did not experience write-downs or losses to FSA. This is not to say there were no loan losses. Nearly 10 percent of the loans experienced losses and these losses were not negligible.

Lengths of loans to termination were close to the term lengths for OL loans. That is, one-year loans paid in full averaged loan lengths of about a year and paid-in-full seven-year loans of about six years. However, not all FO and OL loans have been terminated. When such loans are terminated, the mean loan lengths will increase. That a one-year loan made in FY 1994–1996 is not terminated by November 30, 2004 is vexing. However, the termination rates reported here are minimal rates due to data insufficiencies so it could be that more of the loans have been paid back than it was possible to verify in this study. It is encouraging that for the 75 percent of EM loans terminated, the average term of the loan was between five and six years.

Borrowers exit the FSA programs for a variety of reasons. The findings are somewhat surprising because of the proportion of farmers who left FSA Direct Loan Programs but did not continue farming. About 24 percent of borrowers of loans initiated in FY 1994–1996 but terminated by November 30, 2004 left farming voluntarily. Only slightly more than half of the borrowers who left FSA loan programs stayed in farming (graduated) and only 17 percent of these used FSA guaranteed credit as a transition to conventional credit. Perhaps even more surprising is that 18 percent of the continuing farming group continued farming without any credit at all. Consistent with other findings about FO loans, FO borrowers were less likely to exit. Also, borrowers with larger numbers of other active FSA Direct Loans at time of loan origination were less likely to exit. Those with less FSA involvement were more likely to exit and continue farming or to leave farming voluntarily. Financial strength as measured by the debt-to-asset ratio or net worth at origination was important. Higher debt-to-asset ratios led to fewer exits or to leaving farming voluntarily. Higher net worth at origination made leaving involuntarily less likely.

The evidence on change in financial well-being is mixed but generally positive. Annual changes in net worth were positive and significant. One finding was that non-white races had negative changes in net worth, particularly for OL borrowers. The current ratio did not show a significant change over the sample period nor were the changes significant for a loan type or SDA or BF loan types. Debt-to-asset ratios did increase over time and this was somewhat surprising. The increases were significant for OL loans for regular, BF, and SDA and BF borrowers. The debt-to-asset increases were mostly insignificant for FO borrowers. The increases can partially be explained in terms of life cycle factors or borrowers optimizing leverage. Mean borrower age is relatively young. Hence these borrowers should be in an expansion phase. For farming that means acquiring new debt and expanding the business. Thus increased debt-to-asset ratios can likely be viewed as evidence of increased farming activity.

For the most part, it appears borrowers are using FSA Direct Loans on a temporary basis. A majority of borrowers did not become permanent FSA clients. Most borrowers paid back their loans without a loss. The financial status of most borrowers improved in the sense that net worth improved. On the other hand, current ratios were static on average, and debt-to-asset ratios were increasing—perhaps due to farm expansion.

3. Measuring and Reducing Subsidy Costs

FSA's Direct FLP costs can be roughly divided into administrative and loan subsidy costs. Administrative costs are the charges for personnel, offices, and other overhead expenses necessary for the loan application and monitoring process. The loan

subsidy costs are primarily associated with the losses due to loan default or debt reorganization, except for some loans where the interest rate is lower than the cost to the government of borrowing funds (Koenig and Dodson, 1998).[69]

This section of the study focuses on FSA loan subsidy costs. The overall objective is to describe the extent of subsidy use by various loan programs and to determine what steps can be taken to lower subsidy costs. Lower subsidy costs could enable FSA to expand its lending operations per subsidy dollar budgeted.

The first part of this section reports FSA's Direct FLP default costs in the form of loan principal and interest losses for FY 1994–2004. The second part presents FY 1992–2005 subsidy rates for Direct FLPs. These subsidy rates are applied to loans originated in FY 2000–2003 to estimate the ex-ante subsidy costs for these loans. Econometric models are estimated in the third part to identify factors associated with loan loss occurrences and loan loss rates using the survey data described in section 2. These results along with results reported earlier are then used to investigate how changes in credit standards may result in changes to loan losses.

3.1. Recent Loan Loss Experience for FSA Direct FLPs

The majority of subsidy costs for FSA Direct FLPs in recent years takes on the form of loan defaults and is discussed in greater detail below. But first it is interesting to consider the loan losses of principal and interest over the last decade (table 3.1). During FY1994–2004, the average annual loss of principal and interest for OL, FO, and EM loans combined was $576 million. Over the same period, the largest loss ($1,125 million) occurred in FY1996 and the smallest loss ($260 million) occurred most recently in FY 2004.

It might be expected that FO loans would have experienced the highest losses since they have the largest volume of outstanding principal in each year (figure 3.1). However, the FO loans have the lowest average annual loss ($88 million) compared with those of OL ($148 million) and EM ($341 million). As expected, EM loans have large losses since these loans are given to farmers who have experienced significant income losses because of natural disasters. The beginning-of-year outstanding principal for Direct FO and EM loans decreased consistently every year during the period. These decreasing balances are likely the result of decreasing obligation authority or decreasing demand in recent years relative to earlier years. A consistently declining balance has not been the case for OL loans. The beginning-of-year outstanding principal for OL loans decreased annually from $3,100 million in 1994 to $2,559 million in 1999, and oscillated the rest of the period, ending with $2,723 million in 2004.

The amounts of Direct FLP loan losses have generally trended downward over the FY 1994–2004 period (figure 3.2). Part of the explanation for the downward trend is that FSA was still reacting in the 1990s to the financial crisis in agriculture of the early and mid-1980s. Of the three loan programs, EM loans consistently experienced the largest losses, except for FY 2004 when OL loans sustained higher losses. Loan loss percentages, presented in figure 3.3, are computed from principal and interest losses and beginning-of-year outstanding principal balances. The loss percentages for the three Direct FLPs have trended downward over the period. EM loans have the highest loss percentage with an average annual percentage loss of 13.2 percent, followed by OL loans with 5.3 percent and FO loans with 2.0 percent.

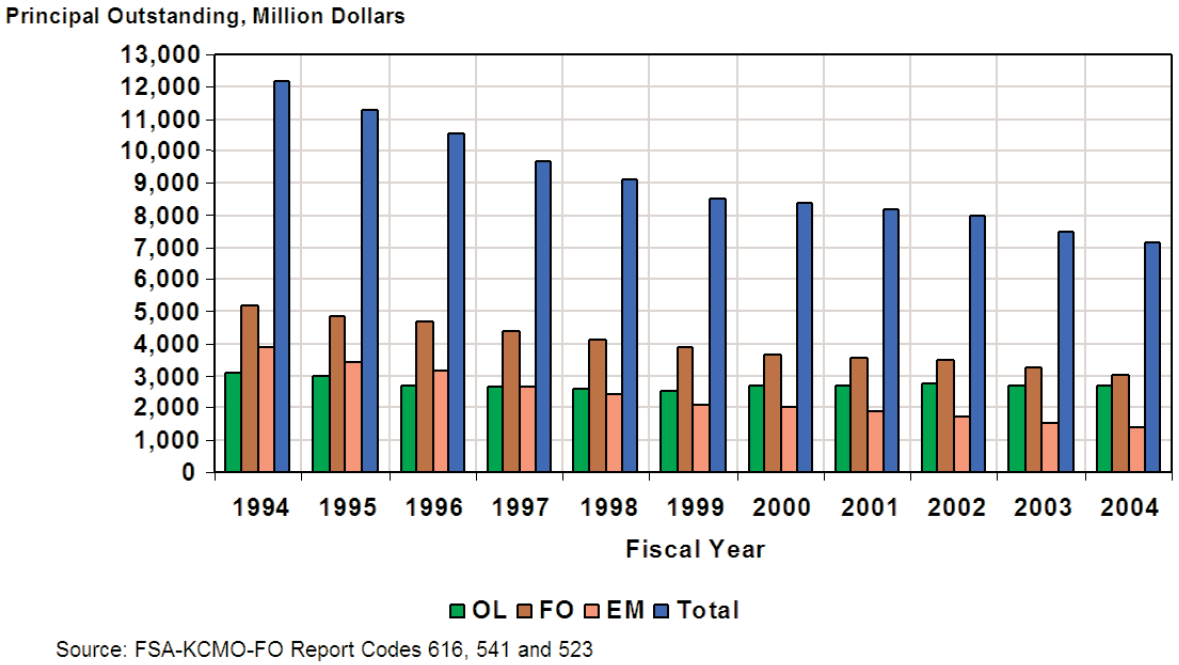
The EM loss percentage was particularly high in FY 1996 when over one dollar of principal and interest was lost for every four dollars of beginning-of-year

[69] Koenig and Dodson (1998) state, "Anticipated loan default costs, repayment rates, and certain transaction costs are other, but more minor, factors that influence the subsidy rate." (p. 3).

Table 3.1. Principal and interest losses for FSA Direct loans, by type, FY 1994–2004 (millions of dollars)

Fiscal Year	OL*			FO**			EM			TOTAL		
	Outstanding principal	Losses	Percent	Outstanding principal	Losses	Percent	Outstanding principal	Losses	Percent	Outstanding principal	Losses	Percent
1994	$3,100	$260	8.4%	$5,181	$177	3.4%	$3,876	$618	15.9%	$12,157	$1,055	8.7%
1995	$2,966	$206	6.9%	$4,841	$137	2.8%	$3,435	$470	13.7%	$11,242	$813	7.2%
1996	$2,705	$113	4.2%	$4,664	$188	4.0%	$3,139	$824	26.2%	$10,508	$1,125	10.7%
1997	$2,656	$146	5.5%	$4,375	$89	2.0%	$2,662	$396	14.9%	$9,693	$631	6.5%
1998	$2,589	$144	5.6%	$4,119	$72	1.7%	$2,395	$357	14.9%	$9,103	$574	6.3%
1999	$2,559	$147	5.7%	$3,857	$64	1.7%	$2,104	$229	10.9%	$8,520	$440	5.2%
2000	$2,692	$116	4.3%	$3,641	$49	1.4%	$2,041	$248	12.1%	$8,375	$413	4.9%
2001	$2,678	$109	4.1%	$3,560	$48	1.3%	$1,907	$135	7.1%	$8,146	$293	3.6%
2002	$2,758	$130	4.7%	$3,484	$53	1.5%	$1,749	$215	12.3%	$7,991	$398	5.0%
2003	$2,715	$128	4.7%	$3,273	$47	1.4%	$1,523	$161	10.6%	$7,512	$336	4.5%
2004	$2,723	$126	4.6%	$3,031	$40	1.3%	$1,405	$93	6.7%	$7,159	$260	3.6%
Total		$1,625	5.3%		$964	2.0%		$3,746	13.2%		$6,336	6.0%

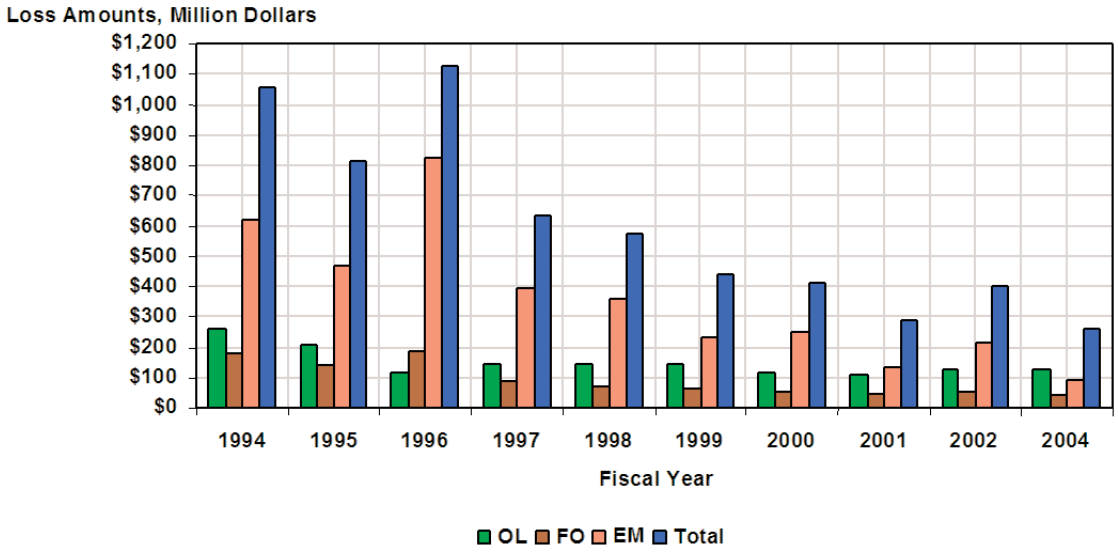
Source: FSA-KCMO-FO Report Codes 616, 541 and 523. FY 1994–2000 Loss Data from General Ledger. FY 2001–2004 Loss Data from DSTH FOCUS File. Principal is beginning-of-year outstanding principal. Losses include both principal and interest. Beginning in FY 2003, losses include judgment cases.
* Includes youth loans.
** Includes Non-Farm Enterprise loans.



Source: FSA-KCMO-FO Report Codes 616, 541 and 523

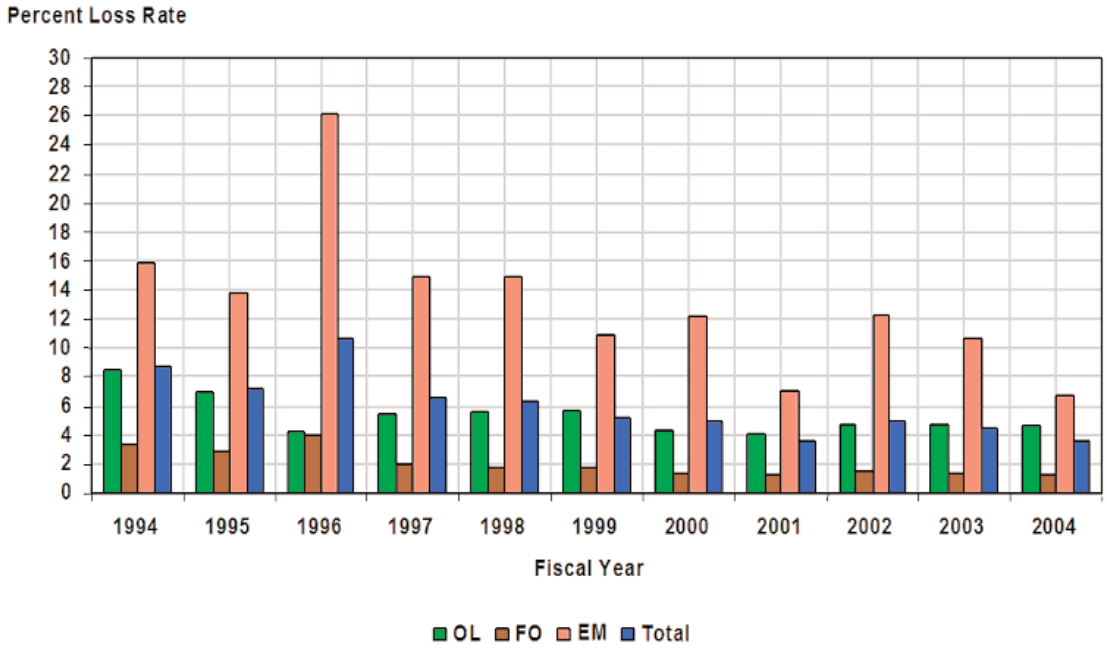
Figure 3.1. FSA Direct loan beginning-of-year outstanding principal by type, FY 1994–2004

outstanding principal. The unusually large losses may have been the result of drought in the southwestern United States. These losses may have also been the result of procedural changes. FSA suspended some foreclosures in March 1993 pending a review of its implementation of borrower appeal rules. The suspension was lifted in February 1994 and a taskforce was formed to collect from borrowers with delinquent, large loans. The taskforce's assignment was expanded in August 1994 to collect on delinquent loans of all sizes for the next two years (USDA/ERS, 1995). Therefore, there may have been a backlog of loans in foreclosure and greater emphasis was placed on collecting delinquent loans. Again, it is not surprising that EM loans experience such large losses since farmers must have experienced large losses of production (30 percent or more), and associated income losses, as the result of a natural disaster to



Source: FSA-KMCO-FO Report Codes 616,541 and 523. FY 1994-2004 Loss Data from General Ledger. FY 2000-2004 Loss Data from DSTH Focus File. Losses include both principal and interest. Beginning in FY 2003, Losses include judgement cases.

Figure 3.2. FSA Direct loan principal and interest loss amounts, by type, FY 1994–2004



Source: FSA-KCMO-FO Report Codes 616, 541 and 523. FY1994-2000 Loss Data from General Ledger. FY2001-2004 Loss Data from DSTH FOCUS File. Principal is beginning of year principal. Losses include both principal and interest. Beginning in FY 2003, losses include judgment cases.

Figure 3.3. FSA percent principal and interest loss rates for FSA Direct loans, by type, FY 1994–2004

qualify for such loans. Also, an EM loan if used as an annual production loan may be secured less well than a corresponding OL loan. An EM loan may only have the growing crop as security, whereas an OL loan may have other chattel property as security in addition to the growing crop, particularly if FSA also has a seven-year OL loan with the farmer.

It is not surprising that FO loans had lower loss percentages than OL and EM loans. FO loans are secured with real estate while OL and EM loans may be secured with non-real estate or real estate. Real estate tends to maintain its value better than non-real estate, particularly over this period when the U.S. average farm real estate-value per acre has increased every year (USDA/NASS, 2004 a). In addition, when cash flows are insufficient to service all debts, real estate-secured loans are more likely to be paid first by farmers since loss of this asset is more critical to the farm business as a going concern than a non-real estate asset. Moreover, there is often more equity to protect in real estate assets than non-real estate assets. Also, farmers are generally more attached to their farmland than non-real estate assets, particularly if the farmland has been owned by their family for a number of years. Therefore, farmers may take greater care not to lose the family homestead, potentially holding more equity, than a tractor which is easily replaced and may have little equity. In addition, FO loans can require more farming experience than farmers receiving OL loans in general.

It is expected that FSA, in its traditional role as lender of last resort, would have higher loss rates than other lenders since FSA borrowers are generally riskier than other borrowers. In addition, FSA may have a lower lien position if a borrower has credit from multiple sources, thus FSA would be more likely to suffer a loss if secured assets are liquidated. USDA presented loss rates for FSA, commercial bank, Farm Credit System, and life insurance lender categories for 1980–2002 (USDA/ERS, 2003).[70] The loss rates for FSA are not directly comparable with other lenders because of accounting differences. For instance, commercial bank loans are moved to non-accrual status after 90 days delinquent, whereas FSA loans continue to accrue interest until settled, perhaps for years because of a lengthy borrower appeal process. However, it is interesting to see how FSA loss rates have changed relative to other lenders over time. The FSA loan loss percentage reached a peak of 16.1 percent in FY 1990 when the loss percentages were 0.2 percent for commercial banks, 0.0 percent for the Farm Credit System, and 0.9 percent for life insurance companies that same year. Since then the differences between the FSA loss percentage and those of the other lenders have narrowed. FSA experienced a decline in loss percentage to 5.6 percent in FY 2002. Conversely, commercial banks and the Farm Credit System saw slight increases in their loss percentages to 0.3 percent and 0.1 percent. Life insurance companies saw a slight decrease in loss percentage to 0.3 percent. Therefore, although FSA has significant loan loss amounts and loss percentages, it appears to have made improvements in its loan portfolio that have resulted in lower loan losses and lower loss percentages over time. Also, FSA loss percentages, while still much higher than those of commercial banks, the Farm Credit System, and life insurance companies, have declined relative to the loss percentages of these other lenders.

3.2. Direct FLP Subsidy Rates

Subsidy rates for FSA Direct Loan and loan guaranteed FLPs are computed by the Office of Management and Budget (2004) credit subsidy calculator with input from the FSA Budget Office subject to the Federal Credit Reform Act of 1990 (P.L. 101-508), as amended by the Balanced Budget Act of 1997 (P.L. 105-33). The four components of the subsidy

[70] The data reported by USDA/ERS for FSA losses are not directly comparable with data reported in table 3.1 because USDA/ERS reports loan losses for other Direct FLPs, for example the Economic Emergency loan program, in addition to OL, FO, and EM loan programs. Also, loss percentages reported by USDA/ERS are for loans outstanding at end of period instead of at beginning of period as reported in table 3.1.

rates are defaults net of recoveries, interest, fees, and all other costs.[71] The estimated subsidy rate is the sum of these components computed on a present value basis. Therefore, the subsidy rate is based on assumptions regarding the future of the economy, interest rates, and loan maturity. Of the four components, the vast majority of the subsidy rate in recent years is attributed to defaults net of recoveries.[72] If defaults net of recoveries were reduced, FSA could provide additional loans to farmers given its current level of funding. For this reason, the focus in this section of the study is on default cost instead of the more general subsidy cost.

Before focusing on default costs, it is enlightening to see how the estimated subsidy rates for FSA Direct FLPs have varied over time. Figure 3.4 presents these subsidy rates for Direct OL, FO, and EM loans for FY 1992–2005. The subsidy rate for EM loans is greater than those for OL and FO loans for most years. It is somewhat surprising that the EM subsidy rate is not the highest subsidy rate every year.[73] As presented earlier, EM loss rates were much higher than those for OL and FO in every year. The downward trend in EM subsidy rates is to be expected given the downward trend in EM loss rates.

Downward trends for OL and FO subsidy rates are also observed for 1992 through 2002, although the FO and OL rates were higher the following three years.

Another unexpected observation from figure 3.4 is the trend to more convergence of OL, FO, and EM subsidy rates. Historically, EM loans have had greater loss rates than OL loans which, in turn, have had greater loss rates than FO loans. These relative loss rates indicate a similar ranking for subsidy rates, i.e., EM subsidy rates greater than OL subsidy rates which are greater than FO subsidy rates. Potential explanations for the changes in these relative subsidy rates, in addition to changes in loss rate predictions, are changes in predicted interest rates and loan maturities. A better appraisal of subsidy rate variability might be possible if the specific methodology for determining subsidy estimates were investigated further.

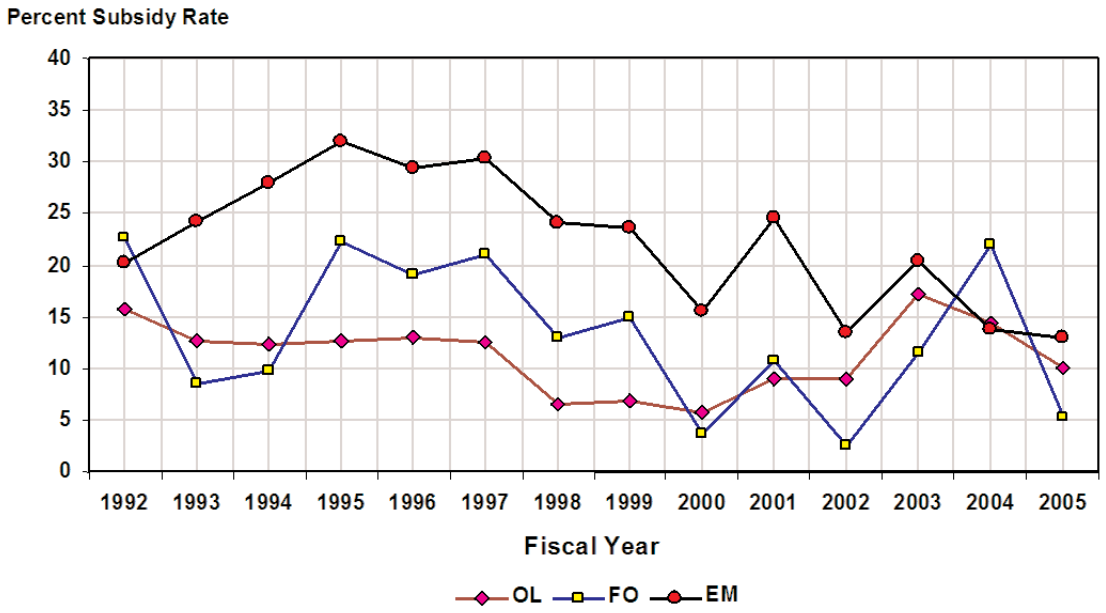
The subsidy rates for Direct FLPs are applied to loans originated in FY 2000–2003 to estimate the subsidy costs for these loans (table 3.2). This estimate of projected subsidy is the best estimate of subsidy cost for these loans at time of origination. Each year re-estimated subsidy rates are computed for every year of loan origination with loans still outstanding. However, these re-estimated subsidy rates incorporate information that was not available at time of origination.

The total loan amount for the 60,151 OL (excluding Youth), FO, and EM loans originated in FY 2000–2003 is $3,741 million (table 3.2). The projected subsidy for these loans is $392 million for an average subsidy rate of 10.5 percent. The average loan amount is $62,191 with an average subsidy of $6,518. Since most of the 2000–2003 loans are OL, it is not surprising that most of the $392 million in total subsidy goes to OL loans, amounting to $274 million. The average OL loan principal is $55,822 with an average subsidy of $5,753 and a subsidy rate of 10.3 percent. EM loans are expected to receive the next highest subsidy at $72 million. The average EM loan amount of $60,177 is only 7.8 percent larger than the average OL loan amount. Yet the average EM loan subsidy of $11,102 is nearly double the average OL loan subsidy indicating, the much higher EM subsidy rate of 18.4 percent.

[71] The fee component is applicable to FSA guaranteed FLPs since a 1 percent fee is collected. However, the fee component is not applicable to FSA Direct FLPs since fees are not collected.

[72] Interest subsidy via the Limited Resource interest rate is very costly when government borrowing rates are high. However, regular OL and regular FO interest rates have been near or below the Limited Resource rate of 5 percent since 2000, such that interest subsidy has been relatively minor.

[73] The FO subsidy rate published for FY 2004 was formulated incorrectly and was used for budgetary purposes (personal communication with Susan Craft, FSA, Budget Office, May 24, 2005).



Source: Office of Management and Budget (2004). The FO subsidy rate published for FY 2004 was formulated incorrectly and was used for budgetary purposes (personal commmunication with Susan Craft, FSA Budget Office, May 24, 2005).

Figure 3.4. Estimated subsidy rates for FSA Direct loan programs, by type, FY 1992–2005

Table 3.2. Ex-ante FSA Direct loan subsidies, FY 2000–2003

Loan type	Number of loans	Mean subsidy	Total subsidy	Mean loan amount	Total loan amount
Total	60,151	6,518	392,069,040	62,191	3,740,835,215
OL	47,540	5,753	273,507,446	55,822	2,653,767,709
FO	6,127	7,601	46,573,544	113,739	696,878,656
EM	6,484	11,102	71,988,050	60,177	390,188,850
OL Regular	24,266	6,179	149,940,817	60,173	1,460,167,783
OL BF	16,762	5,475	91,770,755	53,069	889,541,085
OL BF SDA	3,042	4,919	14,964,311	46,471	141,363,564
OL SDA	3,470	4,851	16,831,564	46,886	162,695,277
FO Regular	1,538	7,299	11,225,417	111,871	172,058,355
FO BF	3,491	7,497	26,171,008	113,816	397,331,079
FO BF Ethnic	356	11,636	3,109,741	170,179	41,870,665
FO BF Gender	297	12,995	2,578,827	170,369	36,154,196
FO SDA Ethnic	267	7,984	2,131,821	111,140	29,674,325
FO SDA Gender	178	7,622	1,356,730	111,180	19,790,035

Source: Subsidy Amount is calculated as Subsidy Rate (Office of Management and Budget, 2004) times Loan Obligation Amount (FSA New Loan Database). The Subsidy Rates vary by year and by loan type (OL, FO and EM).

The FY 2000–2003 subsidy rates are also applied to loans from targeted loan programs within the OL and FO loan programs (table 3.2). The subsidies for each row assume the factors that determine costs to the government, like losses and time until repayment, will be the same within each FLP, e.g., FO BF race and FO SDA gender loans are assumed to have the same losses per dollar of loan and actual pay off terms. The Office of Management and Budget (2004) did not publish subsidy rates for the targeted loan programs within the general loan programs. Since we do not know the exact methodology used by the Office of Management and Budget in determining the OL and FO subsidy rates, we assume potential differences in default costs and loan maturities across targeted loans and non-targeted loans are not explicitly recognized in determining subsidy rates.[74] Recognition of these potential differences may be important in providing better subsidy estimates as discussed later in this section.

The potential geographical distributions of projected subsidy by loan program could be presented in a map by applying the subsidy rates to loans originated in FY 2000–2003. However, these maps would look similar to the maps presented in section 1.2 of this report, showing where the loans have been made. For example, a map showing many FO loans are made in a given state would correspond to a map showing much FO subsidy goes to the same state. Therefore such subsidy maps and any discussion would be redundant and are omitted.[75]

3.3. Factors Associated with Loan Losses

While loan loss amounts, loss rates, and subsidy rates have been presented and discussed above, it is important to identify the factors associated with loan losses as this will allow FSA to develop a better prediction of the success or failure of a given loan. Also, FSA may be able to use this information to adjust its underwriting standards in an effort to reduce subsidy costs. Probit and regression models are estimated to explain the occurrence of loan losses and the percent of loan losses if they occur. The probit model is appropriate for explaining the likelihood of a given event occurring, a loan loss in this case. For this study, the regression model is used to explain the variation of an observable outcome, the loan loss percentage if a loss occurs. Observations for estimating these models are individual loan data collected from the survey of FLMs for a sample of loans originated in FY 1994–1996 described in section 2.1 of this report. The models are used to identify the variables most crucial in predicting the likelihood of a loss and loss percentage. Many of the independent variables in the models are the same variables used in section 2.3 to explain the likelihood of farm exit. These variables include demographic variables, variables indicating the characteristics of the loan, variables about the borrower's past and current involvement with FSA and prior financial stress, and variables measuring the financial characteristics of borrowers at the time of origination.

3.3.1. Technical Presentation of the Incidental Truncation Model

A two-equation, incidental truncation model is hypothesized as presented in Greene (2003) and applied in Dixon, et al. (1997). The first equation, equation 3.1, explains the probability of a loan loss. The second equation, equation 3.2, explains the variation in the percentage of the loan loss if a loss occurs. The forms of these equations are:

(3.1) $z_i = \beta' x_i + \varepsilon_i$

(3.2) $y_i = \gamma' w_i + \eta_i$

where z_i is a binary variable indicating whether or not a loss has occurred for loan i. A loss is said to occur

[74] Alternatively, differences may exist but a decision might be made to average differential subsidy costs within a loan program over all the assistance types in a given loan program.

[75] It was planned that actual Direct FLP loan losses for individual loans during FY 1994-2004 would be available. However, the data were incomplete because of difficulties in retrieving some pertinent data from archives. Since the complete data were not available, planned geographical analyses at the county level and loan program analyses similar to those presented in tables 3.1 and 3.2 and figures 3.1 through 3.4 could not be performed.

when the FLM indicates either the loan has experienced a debt write-down or the loan terminated due to foreclosure, bankruptcy, or debt write-off and there was a dollar amount recorded.[76] The variable y_i is the dollar loss amount divided by the initial loan amount, in percent, for loan i when z_i equals 1. The vectors x_i and w_i represent independent variables. Vectors β and γ contain parameters to be estimated. The error terms ε_i and η_i are assumed to be normally distributed with zero means and variances of one and σ^2. Incidental truncation occurs if the covariance of ε_i and η_i is not zero.

Equation 3.1 is the selection equation that predicts the probability of a loan experiencing a loss. Equation 3.2 is the regression equation that explains the variation in loss percentages among loans with losses and predicts the loan loss percentage for a given w_i. The selection equation is estimated as a probit model since the dependent variable is binary (0-1). The dependent variable in the regression equation is only observable if a loan loss occurs. This may result in incidental truncation. A two-step estimation approach is used to obtain consistent estimates of the parameters in the regression equation (Greene, 2003).

The procedure is to estimate the selection equation as a probit model, then use the parameter estimates to estimate the inverse Mill's ratio (IMR), which accounts for any incidental truncation. The IMR is then included as a regressor in the regression equation. If the estimated IMR coefficient is statistically insignificant in the regression equation, it indicates insignificant incidental truncation and the IMR may be dropped from the regression equation. The regression equation can then be re-estimated using ordinary least squares. An estimation consideration is the presence of heteroscedasticity in the regression equation. To allow for this situation, the standard errors in the regression equation are estimated using White's heteroscedasticity-consistent estimator.

The same independent variables are hypothesized for both equations of the model, since variables thought to be associated with a loan loss occurrence are also thought to be associated with the percent of loan loss.

3.3.2. Empirical Model Specification

The independent variables included in the estimated empirical model are grouped into four categories as was done for the multinomial logit model in section 2 of this report: (1) borrower demographics, (2) characteristics of the current loan, (3) prior financial distress and involvement with FSA Direct Loans, and (4) borrower financial characteristics. An exact description of the variables is given in table 3.3 and descriptive statistics are presented in table 3.4. Demographic variable age (AGE) measures the wealth of knowledge that the borrower has accumulated, which is expected to be negatively related to loan losses.[77]

Characteristics of the current loan include whether the loan is OL, one-year OL (ONEYR), FO, Limited Resource (LR), BF, or SDA. These variables are binary and take on the value of 1 if the loan has the particular characteristic. It is expected that OL, ONEYR, and FO are negatively related to the incidence of a loss and the percentage of the loss relative to the effect of EM loans, which is captured by the constant term in the estimated equations. These relationships are expected because OL and FO loans have lower loss rates than EM loans, as discussed earlier. It is expected that LR is unrelated to loss occurrence and

[76] A discussion of loan write-down and write-off is in section 2.2.4. There are loans that are still active and may potentially have a loss occur in the future. However, these loans are assumed to have zero loss for the analysis presented here since none had occurred prior to the survey.

[77] Other demographic variables considered are number of years of farming experience (EXP), number of household members (HOUSEMEM), marital status (MAR), race (RACE), and gender (FEMALE). AGE and EXP are highly correlated, so only AGE is included in the estimated model since there are more observations for this variable than EXP. HOUSEMEM and MAR were statistically insignificant during pretest estimation and subsequently deleted from the model in the interest of parameter parsimony. Binary variables RACE and GENDER were considered during pretest estimation, however, they are related to the SDA variable, which was included in the estimation.

Table 3.3. Incidental truncation model variable definitions

Dependent variables	
LOSS	Binary variable with value of 1 if loan experienced a loan write-down or debt write-off or both, 0 otherwise,
LOSSPCT	Amount of loan write-down or write-off divided by initial loan amount, in percent,
Independent variables	
AGE	Age in years of the operator at time of loan application,
OL	Binary variable with value of 1 if loan is OL, 0 otherwise,
ONEYR	Binary variable with value of 1 if loan is one-year OL loan, 0 otherwise,
FO	Binary variable with value of 1 if loan is FO, 0 otherwise,
LR	Binary variable with value of 1 if loan has a limited resource assistance code, 0 otherwise,
BF	Binary variable with value of 1 if loan has a beginning farmer assistance code, 0 otherwise,
SDA	Binary variable with value of 1 if loan has a socially disadvantaged assistance code, 0 otherwise,
NUMOL	Number of active OL loans at time of loan application,
NUMFO	Number of active FO loans at time of loan application,
NUMEM	Number of active EM loans at time of loan application,
DEBTSETT	Binary variable with value of 1 if applicant had ever been released from personal liability as part of a debt settlement action, 0 otherwise,
DA	Total liabilities divided by total assets,
CR	Total current farm assets divided by total current farm liabilities,
REPAY	Balance available for debt service divided by total debt service due that year,
CRPINPRO	Proportion of crop and livestock cash farm income from crops,
TCFI	Total cash farm income from crop, livestock, and other farm income in thousands of dollars.

loss percentage. An LR loan initially receives a lower interest rate so it will have a similar repayment capacity as a non-LR loan that does not receive this lower interest rate. Therefore, LR and non-LR loans should have a similar chance of success if all other non-repayment capacity characteristics of the borrowers and loans are the same. However, if the borrower and farm operation associated with an LR loan actually have more limited resources than those of a non-LR loan such that the lower interest rate does not fully compensate for these limitations, a positive relationship would be expected. There are no prior expectations on the signs of the BF and SDA coefficients.

The third category of independent variables contains variables available at the time of origination about past and current involvement with direct loans and prior financial distress. Variables included in the estimation to gauge the level of involvement and how much experience the borrower has with FSA are the number of active OL loans at time of application (NUMOL) and similar measures for number of FO loans (NUMFO) and number of EM loans (NUMEM).[78] The signs of the coefficients are unknown *a priori*. A positive relationship between the number of loans and loan loss rates would indicate that as FSA borrowers become more reliant on FSA loans instead of loans from conventional creditors, the weaker financial situation they are in and the more likely they are to have a loan loss. Conversely, a negative relationship would indicate more and better information between the borrower and FLM such that the borrower has performed satisfactorily on the loans and the FLM is willing to extend additional credit to the borrower.

[78] A binary variable that indicates previous FSA involvement is the response to the question, "Has this borrower or any member of an entity ever obtained a direct loan or guarantee from Farmers Home Administration?" (PREVFSA). PREVFSA was statistically insignificant during pretest estimation and subsequently deleted from the model in the interest of parameter parsimony.

Table 3.4. Weighted descriptive statistics of variables in incidental truncation model

Variables	Mean	Std. dev.	N
LOSS	0.09	0.29	2,289
LOSSPCT (%)	133.56	196.12	184
AGE	41.17	12.83	2,285
OL	0.71	0.45	2,715
ONEYR	0.39	0.49	2,715
FO	0.11	0.32	2,715
EM	0.17	0.38	2,715
LR	0.28	0.45	2,715
BF	0.23	0.42	2,715
SDA	0.07	0.25	2,715
NUMOL	1.41	1.71	2,282
NUMFO	0.44	0.85	2,289
NUMEM	0.42	1.00	2,288
DEBTSETT	0.04	0.20	2,414
DA	0.69	0.83	2,279
CR	2.01	9.36	1,932
REPAY	1.16	1.19	2,290
CRPINPRO	0.61	0.42	2,278
TCFI ($1000)	153.47	161.46	2,301

A binary variable indicating prior financial difficulty is created from responses to the question on the loan application: Has the proposed entity had a loan debt settlement action (DEBTSETT)?[79] DEBTSETT is expected to be positively related to loan losses. It suggests that if the borrower has had financial difficulty in the past, debt settlement in itself may not be enough assistance to have the borrower completely recover from the past problems. It also suggests that if the borrower has been able to settle debts when in financial difficulty in the past, the borrower may have learned from this experience and is thereby more likely to settle debts in the future.

Borrower financial variables are computed from information documented in the Farm and Home Plan and available to the FLM prior to loan closing. The total debt-to-asset ratio (DA) measures relative solvency and is expected to be positively related to losses. The current ratio (CR) measures liquidity and is expected to be negatively related to losses. Repayment ability (REPAY) is the ratio of the balance available to service principal and interest payments to the total amount of principal and interest due. REPAY is expected to be negatively related to losses.

An indicator of borrower farm type is the proportion of crop and livestock cash farm income from crops (CRPINPRO). Crop income is typically more variable than livestock income because weather variations have a larger impact on crop income than livestock income (Dixon et al., 2004; Settlage et al., 2001). Since crop income is riskier than livestock income, a positive relationship between the proportion of farm income from crops and loan losses is expected.

Finally, total cash farm income in thousands of dollars (TCFI), also known as gross cash farm income, is a measure of farm size. The *a priori* relationship between farm size and loan losses is unknown. It is

[79] Two other binary variables created from information in the loan application and indicating prior financial distress are FINDIS, which indicates that the applicant or any member of the proposed entity has been in receivership, been discharged in bankruptcy, or filed a petition for reorganization in bankruptcy, and FEDDEBT, which indicates the applicant has been delinquent on federal debt. Neither of these variables was statistically significant during pretest estimation, and they were subsequently deleted from the model.

commonly thought larger farms are more likely to take advantage of size economies and be more efficient. This suggests larger farms are less likely to have loan losses. However, larger farms, particularly farms with limited financial and managerial resources that are common among LR and non-LR FSA borrowers, may be difficult to manage effectively, resulting in a greater probability of a loan loss.[80]

3.3.3. Estimation Results for the Loan Loss Selection Equation

The selection equation is estimated as a probit model and the parameter estimates are used to estimate the IMR. The IMR is included as a regressor in equation 3.2, the regression equation, and is found to be statistically insignificant. Therefore, equation 3.2 is re-estimated without the IMR using ordinary least squares. The results of the estimated selection and re-estimated regression equations are presented in tables 3.5 and 3.6.[81]

The test of the hypothesis that all coefficients equal zero is a test of equation validity. The χ^2 statistic for the selection equation and the F statistic for the regression equation clearly reject this hypothesis for both equations. Measures of explanatory power are also considered. Equation 3.1 predicts 92 percent of the observations correctly as having a loss or not. This percentage is no better than if all loans are predicted to not have a loss, which would also result in 92 percent of the loans being predicted correctly.

Table 3.5. Estimated loan loss selection equation by Probit model

Dependent variable is LOSS				
Independent variable	Coefficient	Standard error	t-ratio	p-value
CONSTANT	-1.172	0.364	-3.218	0.001
AGE	-0.007	0.004	-1.639	0.101
FO	-0.478	0.269	-1.780	0.075
OL	0.185	0.150	1.233	0.217
ONEYR	-0.166	0.113	-1.464	0.143
LR	0.139	0.110	1.264	0.206
BF	0.125	0.147	0.852	0.394
SDA	0.110	0.193	0.569	0.570
DEBTSETT	0.848	0.166	5.109	0.000
NUMOL	-0.004	0.030	-0.118	0.906
NUMFO	-0.132	0.064	-2.062	0.039
NUMEM	0.007	0.047	0.153	0.878
DA	0.222	0.069	3.221	0.001
CR	-0.064	0.035	-1.829	0.067
REPAY	-0.446	0.225	-1.986	0.047
CRPINPRO	0.229	0.124	1.839	0.066
TCFI	0.001	0.000	3.637	0.000
n	1,738			
χ^2	98.907		p-value	0.000
% Correct*	91.945			

*Percent of observations in the sample correctly classified by the probit model.

[80] Total planned acreage (ACRES) was an alternative measure of farm size. This variable was statistically insignificant and was subsequently dropped from the model.

[81] The regression results with and without the IMR were similar. The only differences were that FO was insignificant and OL was only significant at the 0.10 level in the regression equation with IMR and FO and OL were significant at the 0.05 level when IMR was excluded.

Equation 3.2 has an R^2 of 0.197, indicating nearly 20 percent of the variation in loan loss rates is explained by the independent variables, which is respectable for cross-sectional data, but also means much of the variation is left unexplained. This is not surprising considering economic, social, and personal events that occur after loan origination are likely to have a large impact on the potential success of a loan and are not captured by the model.[82] The selection and regression equations have significant coefficient estimates, which indicate explanatory power.

The estimated selection equation has a number of variables with significant coefficients at the 0.05 level for a two-tailed test. All of these coefficients have the anticipated signs. The DEBTSETT coefficient has a positive sign that indicates a positive relationship between the borrower having a previous debt settlement experience and FSA having a loan loss occur. This indicates that these borrowers are higher risk and they may not have received enough debt relief for them to be successful with future loans.

This debt settlement result is also similar to a moral hazard issue of property insurance that is frequently cited. Owners of property that is fully insured may not take all the necessary actions required to fully protect their property because they will be made whole by the insurance payment if a loss occurs. This is analogous to a farm borrower who may not do everything in their power to repay a loan if they think or, particularly, if they have experienced, that they will be able to settle for less than full repayment.

While there was no expected sign *a priori* for the NUMFO coefficient, the negative sign supports the notion that information about the farm business and borrower is learned by the FLM because of their previous experience with the borrower. This information may be used to make a better decision, i.e., not make a bad loan. It can also be argued that borrowers with more FO loans are more dedicated to paying off loans to increase their likelihood of keeping their land and protecting equity.

Borrower financial characteristics are important in explaining the probability of a loan loss occurring. As expected, the probability of loan loss increases as the debt-to-asset ratio increases (solvency decreases). Borrowers with high debt-to-asset ratios are highly leveraged and unable to withstand financial setbacks that are more likely to lead to loan losses. The repayment ratio is also related to loan losses. As expected, borrowers with greater repayment capacity are less likely to have a loss. In addition, the current ratio is related to loan losses, although at the lower level of statistical significance of 0.10. As expected, borrowers with greater liquidity are less likely to have a loss.

The size of the farm business (TCFI) is important in explaining loan loss occurrences for this sample of FSA loans. Larger farms, as measured by the farm's planned total cash farm income, have a greater probability of having a loan loss. This supports the hypothesis that larger farm businesses require larger FSA loans, and the farmers may not have the necessary financial and managerial resources to successfully repay their loans. Also, these larger farms with larger loans may not have sufficient non-farm income to assist in paying loan payments and family living expenses.[83] An alternative explanation may be that larger farm businesses with FSA loans are more likely to have received EM loans because OL and FO loans are targeted to relatively smaller farm businesses.[84]

[82] Similar to the discussion in section 2.3.2, the model is incomplete because only information available at the time of loan origination is included, yet events occurring after loan closing that are likely to have a large impact on the loan are excluded.
[83] The data support the hypothesis that total cash farm income and loan size are positively related. Also, the data support the hypothesis that total cash farm income and non-farm income are negatively related.
[84] The data support the hypothesis that EM loans go to larger farms than do OL and FO loans. For observations used to estimate equation 3.1, it was found that planned total cash farm income for farms that received EM loans was $68,952 and $111,442 greater than for farms that received OL and FO loans, respectively. These are statistically significant differences.

Large farm businesses with EM loans have experienced a significant income loss that they may not recover from, even with a low interest loan, ultimately resulting in a loan loss. However, the selection equation controls for this relationship by having the constant term capture the effect of EM loans on loan losses.

The FO coefficient in the selection equation is marginally significant at the 0.10 level, implying FO loans have a lower probability of having a loss. This result is consistent with the data presented earlier showing FO loans have lower loss rates than EM loans.

The marginal significance of the CRPINPRO coefficient indicates that the likelihood of a loan loss increases as the farm has more crop cash income relative to livestock cash income as expected. A conclusion from this result is that crop farms have a greater chance at a loan loss than livestock farms because crop income is riskier than livestock income.

3.3.4. Estimation Results for the Loss Percentage Regression Equation

All of the estimated regression equation coefficients that are significant have the anticipated signs (table 3.6). The negative signs on the estimated FO and OL coefficients indicate loan loss percentages are 154 and 105 percentage points less for FO and OL loans than for EM loans.[85] FO loans primarily rely on real estate to secure the loan. As was mentioned earlier, real estate values have increased steadily since 1994. Therefore, unpaid principal and interest on an FO loan are more likely to be repaid from liquidation of the real estate security compared with those on an EM loan, which may or may not be secured by real estate. Also, OL loans have lower loss rates than EM loans, as was shown earlier.

There was not an expected sign for the BF coefficient. However, the regression results indicate BF loans have a 143 percentage-point larger loss rate than the base case captured by the constant term.[86] Perhaps FLMs are more willing to use various servicing accommodations with BF loans than other loan types in an attempt to allow beginning farmers to continue farming. For example, multiple restructurings of unpaid principal and interest into ever larger loans may ultimately result in a large loan loss. However, survey data to test this hypothesis are unavailable. An alternative explanation for BF loans having larger loss percentages than non-BF loans when a loss occurs is that BF loan losses occur earlier and thereby reflect larger losses since little principal has been retired relative to non-BF loans. The data support the hypothesis that BF loan losses occurred sooner after loan origination than do non-BF loan losses.[87]

The repayment variable is the only borrower financial characteristic found to be significant in explaining the loan loss percentage. As the amount available for debt servicing increases relative to the amount required to service debt, the loan loss percentage decreases as expected. Although the projected repayment capacity was not sufficient to keep a loss from occurring, the loss percentage was smaller the greater the planned repayment capacity.

Perhaps the most surprising finding is the lack of significance for debt-to-asset ratio. Although the sign of the coefficient indicates loan loss percent increases as

[85] The results from a loan loss amount regression indicate loan losses are $54,899 and $34,456 less for FO and OL loans than for EM loans.

[86] The results from a loan loss amount regression indicate loan losses are $40,880 more for BF loans than the base case captured by the constant term.

[87] Another alternative explanation is that BF farmers rely more on FSA credit than do non-BF farmers, such that when a loan loss occurs, few other loan sources are available. Surprisingly, the FSA proportion of total liabilities is less for BF farmers than non-BF farmers, although not significantly. This in itself could contribute to the BF loans having larger losses. The non-FSA creditors for the BF farmers may have a superior lien position to FSA, such that when a loss occurs, the non-FSA creditors are more likely than FSA to be repaid from the liquidation of secured property.

Table 3.6. Estimated loan loss percentage regression equation

Dependent variable is LOSSPCT				
Independent variable	Coefficient	Standard error	t-ratio	p-value
CONSTANT	339.045	116.059	2.921	0.004
AGE	1.085	1.153	0.941	0.349
FO	-154.415	54.816	-2.817	0.006
OL	-105.421	46.841	-2.251	0.026
ONEYR	-23.745	27.222	-0.872	0.385
LR	17.793	35.065	0.507	0.613
BF	142.810	63.105	2.263	0.026
SDA	2.261	34.074	0.066	0.947
DEBTSETT	-4.076	30.164	-0.135	0.893
DA	23.177	38.354	0.604	0.547
CR	8.993	7.365	1.221	0.225
REPAY	-222.740	79.762	-2.793	0.006
CRPINPRO	49.905	32.268	1.547	0.125
TCFI	-0.030	0.034	-0.872	0.385
n	124			
F	2.080			
R^2	0.197		p-value	0.021
Adjusted R^2	0.102			

debt-to-asset ratio increases, the estimate is insignificant. Of course all the assets are not necessarily taken as collateral to securitize the FSA loan. Some assets are non-farm assets and the borrowers are reluctant to offer additional collateral. A better measure would be collateral value relative to loan value, although the measure was not collected by the survey. It would be expected that loan loss percentage decreases as the collateral-to-loan value increases.

3.3.5. Implications of the Loan Loss Estimations

The results from the estimation of the selection and regression equations have implications for reducing loan losses. In simplest terms, loan loss occurrence may be reduced several ways: by rejecting applicants who have had previous debt settlement experience; by encouraging loans to borrowers who already have FO loans; by requiring loans be given to farmers with lower debt-to-asset ratios, higher current ratios, and greater repayment capacity; by making fewer loans to crop farms; and by focusing loans on smaller farms. When a loan loss occurs, the percentage of the loan loss would be reduced by making proportionately more FO and OL loans relative to EM loans, decreasing the number of BF loans, and making loans to farmers with greater repayment capacity. Loss reductions are not as simple as this.

The debt settlement result is quite interesting. The Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104-127) limited the number of times FSA may provide debt forgiveness to a borrower to just one time. The legislation goes on to make borrowers receiving debt forgiveness ineligible for additional direct or guaranteed loans, with an exception of allowing OL loans for annual operating expenses in cases of certain loan write-downs (USDA/ERS, 1997). The debt settlement result from the selection equation suggests that FSA should strictly adhere to this legislation in an effort to reduce the number of loan losses. Even then, losses may occur on the annual operating expense-type OL loans these borrowers subsequently receive. However, it would be difficult to justify disallowing these borrowers credit for annual operating expenses just after FSA has written down their debts to levels that are expected to be manageable.

The debt settlement result brings up the broader question of allowing loan write-downs, write-offs and debt settlements in the first place without the borrower filing for liquidation bankruptcy. Although loan write-downs, write-offs, and debt settlement are limited to the net recovery value of liquidating secured property, these actions may promote unethical behavior, such that the borrower has learned from this experience and is more likely to settle debts in the future in this manner (moral hazard problem). However, debt settlement may be effective at keeping more farmers farming, although at a lower rate than farmers without debt settlement experience. Of the loans in the survey to farmers with a previous debt settlement, 63 loans did not report a loss and 36 loans did report a loss. Presumably, more farmers benefited from previous debt settlement and did not have a loss on a subsequent loan than did have a subsequent loan loss. In fact it could be argued that the prior debt settlement assistance received by the farmers with subsequent loan losses was insufficient assistance for the farmers to be successful with those loans.

Financial characteristics are important in explaining the likelihood of a loan loss. Restricting loans to farms with less than a certain debt-to-asset ratio or greater than a certain repayment capacity would likely reduce the number of loan losses. However as was seen in section 1.5, many FSA applicants with high debt-to-asset ratios or low repayment ratios who receive loans would instead be denied credit by FSA if debt-to-asset and repayment limits are put in place. Some of these applicants—if granted loans—would have a loan loss, although many more would likely make a positive contribution to agriculture if they received FSA loans. The same thing could be said for restricting loans to farms with greater than a certain current ratio.

The results suggest that crop farms are more likely to have loan losses than livestock farms. Crop insurance and additional collateral beyond the crop itself are needed to decrease the chance of a loan loss. FSA already emphasizes providing loans to small farms. The selection equation results suggest that a continuation of this policy would limit the number of loan losses.

FO loans have inherently low loss rates. Land values have increased, at least over the study period, so that the collateral value has increased as opposed to non-real estate collateral, which frequently decreases (depreciates) in value. This is particularly important because of the lengthy appeal process for FSA borrowers and the accruing of interest on delinquent loans. Also, a real estate-secured loan is more likely to be paid before a non-real estate-secured loan when cash flows are tight since the loss of real estate is often more critical to the farm business as a going concern than a non-real estate asset. This implies FSA loans need to be secured with ample collateral. Including farmland as collateral, when possible, would likely reduce loan losses.

If FO loans have inherently low loan losses, EM loans have inherently high loan losses. It should be expected that EM loans have large loan losses because the farms with these loans have experienced large production and income losses from which the operator may never recover, even with the assistance of an EM loan. Attention should be given to having insurance products ex ante substitute for EM loans in certain circumstances. Over the years, farm policy has occasionally required farmers to purchase insurance in order to receive farm program payments and qualify for emergency assistance. Putting this policy firmly in place should guard against adverse selection, i.e., farmers who are more likely to qualify for emergency assistance are less likely to purchase insurance since they believe the government will come to their assistance if a natural disaster occurs. Although an EM loan may allow the farmer to spread the income loss over a number of years following a disaster, the farmer may really need a grant (or an insurance check) to be able to recover. It is recommended that EM loans also be secured with ample collateral.

It is difficult to provide a recommendation related to the finding that BF loans are related to greater loss rates. FSA has increased the emphasis on providing loans to beginning farmers. Beginning farmers are the most likely group of farmers to be denied credit from conventional creditors since they have little experience, no track record, and often, little equity. Many small businesses outside of agriculture ultimately fail, and it should be expected that many small farm businesses are no different. These small farm businesses are risky by nature, and it is a matter of public policy whether or not the government will continue to assume the risk associated with providing loans to them.

The results from the selection and regression equations indicate that LR loans are not a significant factor in explaining loan losses. This implies that the subsidized interest rate associated with LR loans is allowing farmers receiving LR loans to have similar success at repaying their loans as those farmers receiving non-LR loans. However, although the default subsidy appears to be similar for LR loans and non-LR loans, it comes at the cost of increased interest subsidy.

3.4. Summary

The major component of subsidy costs for FSA Direct FLPs in recent years is loan default cost. The outstanding principal, principal and interest loan losses, and loss rates have had a downward trend over the FY1994–2004 period. The average annual loss of principal and interest for OL, FO, and EM loans combined over this period was substantial at $576 million. However, the most recent loss in FY 2004 was less than half that at $260 million. The difference in loss rates between FSA and other lenders has also followed a downward trend over this period.

The estimation results of the selection and regression equations have implications in reducing loan losses. The likelihood of a loan loss is found to be positively related to borrowers with previous debt settlement experience, higher debt-to-asset ratios, lower current ratios, less repayment capacity, crop farms, and larger farms and negatively related to borrowers already having or receiving an FO loan. When a loan loss occurs, the percentage of the loan loss is positively related to beginning farmer loans and negatively related to borrowers with FO and OL loans and greater repayment capacity. Loan losses are not found to be significantly related to LR or SDA loans.

It is clear that there is substantial volatility in computing ex ante subsidy rates. The reasons for this volatility should be an area of future study. However, it appears from the loan loss results presented in this section that EM loans should have higher subsidy rates than OL loans, which should have higher subsidy rates than FO loans. Also, an assignment of higher subsidy rates to beginning farmer loans than non-beginning farmer loans may be justified.

It was planned that actual Direct FLP loan losses for individual loans during FY 1994–2004 would be available. However, the data were incomplete because of difficulties in retrieving some pertinent data from archives. If such data were to become available in the future, it would be useful to compute various loan loss rates and conduct geographical analyses at the county level and loan program analyses similar to those presented in tables 3.1 and 3.2 and figures 3.1 through 3.4.

Conclusions

Direct FLPs appear to be serving their intended clientele. Recent FLP borrowers are more financially stressed than non-borrowers and would be generally considered as family farms. About 78 to 92 percent would qualify as small family farms using USDA's Small Farms Commission definition. The Direct FLP credit market penetration is relatively high among farms likely to be eligible for these credit programs, despite the fact that these programs represent a relatively small proportion of total outstanding agricultural debt. Increasing market penetration or the share of farms served by the program would require greater obligation funding and hence greater budgetary costs. Conversely, implementing more rigorous loan eligibility criteria would likely lower the number of operators receiving loans and hence loan loss occurrences and subsidy rates would likely fall.

The concept of "creditworthy" is not well defined for the purposes of loan eligibility for FLPs. Almost any borrower is risky in the sense that unforeseen events can transpire that could preclude repayment. Thus creditworthy is not a discrete concept but a continuous one. There are degrees of credit worthiness. FSA experiences higher loan loss rates than conventional agricultural lenders. This is to be expected because commercial lenders can be more selective in choosing borrowers and price loans to match risk profiles, which FSA does not do. In essence, FSA's mission is to provide credit to riskier "creditworthy" borrowers. The agency is accomplishing this goal. The natural consequence is that FSA loan loss rates are higher than for conventional lenders. Whether the current borrowers are too risky or should even riskier borrowers be included are policy questions. The analysis indicates that attempts to cut losses systematically would imply denying credit to some current borrowers.

A majority of borrowers from FY 1994–1996 used FLPs as a transitional tool. At time of origination, FSA Direct borrowers had fewer years of farming experience than the farming population at large. More than half of these borrowers no longer had active FLP loans by the end of November 2004. So for the majority of borrowers, FLPs are not a lifetime credit source. FLPs are helping farmers move to conventional credit or aiding farmers who subsequently leave farming completely, as is common among U.S. farmers. Not surprisingly, farmers in stronger financial condition originating FSA Direct Loans are more likely to exit and have fewer outstanding loans with FSA. Thus exit rates could be increased by tighter eligibility standards. But such a policy would eliminate the riskier borrowers and policy considerations may dictate that it is exactly these riskier borrowers who should be served.

This research has described and analyzed various aspects of the Direct FLPs but, in the process, has raised other issues that deserve further investigation. Is there a long-term class of borrowers? That is, do some borrowers utilize FLPs continuously over thirty or forty years? If so, what characterizes them? Are there ways to motivate them to exit FLPs after a few years? Would the mandating of crop insurance as a condition of obtaining loans curtail FSA default costs? Could more extensive study of ex post subsidy rates explain, and perhaps dampen, the volatility in ex ante subsidy rates?

In calling for further analysis, it is important that FSA collect information useful to research. Currently, data are collected with the objective of originating and servicing existing loans. While much useful research data are generated in the process, research considerations would require some changes. For example, we noticed that in many of the Farm and Home Plans examined from FY 2000–2003, zeroes were recorded where almost surely the data were missing. While this might be understood by Farm Loan Managers that such data are missing, it is not clear to researchers. FSA has upgraded its application process so that data from applications and Farm

Business Plans, which have replaced Farm and Home Plans, could be made available electronically. It would be useful for FSA staff concerned with research and program evaluation to examine existing forms to see how they could be altered to still serve the primary roles of borrower evaluation and loan monitoring but also provide useful information for research and program evaluation. Mandatory filing of Farm Business Plans at least every five years for continuing borrowers would provide very useful data on the financial progress of borrowers.

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Appendices

Appendix 1.A. Abbreviation Definitions

APL	Application File
ARMS	Agriculture Resource Management Survey
BF	Beginning Farmer
CBA	Classification of Borrower Account
CFR	Code of Federal Regulations
CSREES	Cooperative State Research, Education, and Extension Service
DLPESA	Direct Loan Program Effectiveness Study Application
EM	Emergency Loan
ERS	Economic Research Service
FHP	Farm and Home Plan
FIPS	Federal Information Processing Standards
FLM	Farm Loan Manager
FLP	Farm Loan Program
FmHA	Farmers Home Administration
FO	Farm Ownership Loan
FOBF	Farm Ownership Loans to Beginning Farmers
FONONBF	Farm Ownership Loans to Non-Beginning Farmers
FSA	Farm Service Agency
FY	Fiscal Year
NASS	National Agricultural Statistics Service
NL	New Loan Database
NO	New Originator
OL	Farm Operating Loan
OLBF	Operating Loan to Beginning Farmers
OLNONBF	Operating Loan to Non-Beginning Farmers
OMB	Office of Management and Budget
SAS	Statistical Analysis Software
SDA	Socially Disadvantaged
USDA	United States Department of Agriculture

Appendix 1.B. Definitions of Targeted Groups

Socially Disadvantaged Farmers

The 2004 FSA definition of socially disadvantaged farmer is: "A socially disadvantaged farmer or rancher is one of a group whose members have been subjected to racial, ethnic, or gender prejudice because of their identity as members of the group without regard to their individual qualities. For purposes of this program, socially disadvantaged groups are women, African Americans, American Indians, Alaskan Natives, Hispanics, and Asian Americans and Pacific Islanders."
http://www.fsa.usda.gov/pas/publications/facts/html/sdaloan02.htm, accessed June 1, 2005.

Beginning Farmers

The 2004 FSA definition of beginning farmer is: "A beginning farmer or rancher is an individual or entity who (1) has not operated a farm or ranch for more than 10 years; (2) meets the loan eligibility requirements of the program to which he/she is applying; (3) substantially participates in the operation; and, (4) for FO loan purposes, does not own a farm greater than 30 percent of the average size farm in the county. (Note: all applicants for direct FO loans must have participated in business operation of a farm for at least 3 years.) If the applicant is an entity, all members must be related by blood or marriage, and all stockholders in a corporation must be eligible beginning farmers."
http://www.fsa.usda.gov/pas/publications/facts/html/begloan02.htm, accessed June 1, 2005.

Direct Loan Eligibility

In 2004, the FSA definition of direct loan program eligibility is: "A direct loan applicant must: have sufficient education, training, or experience in managing and operating a farm or ranch that demonstrates the managerial ability needed to succeed in farming; be a citizen of the United States (or legal resident alien), which includes Puerto Rico, the Virgin Islands, Guam, American Samoa, and certain former Pacific Trust Territories; have the legal capacity to incur the obligations of the loan; be unable to obtain credit elsewhere; have an acceptable credit history; be the operator or tenant operator of a family farm after the loan is closed. For a Farm Ownership Loan, the producer must also own the farm. For an Operating or Emergency Loan, the producer need only be the operator; not have had a previous loan which resulted in a loss to the Agency (with certain exceptions); not be delinquent on any federal debt; Corporations, cooperatives, joint operations, and partnerships and their members/stockholders must meet these same eligibility requirements, and the entity must also be authorized to operate a farm or ranch in the State where the land is located."
http://www.fsa.usda.gov/dafl/directloans.htm#Eligibility, accessed June 1, 2005.

Appendix 1.C. Matching Farm and Home Plans to Borrowers in the New Loan Database

The data records analyzed in this study contained information extracted from several sources and databases. Information was aggregated and combined to create one record per borrower for each of the federal fiscal years from 2000 to 2003. First the New Loan (NL) database was used to summarize loan information for those who received one or more direct loans in a given year. Demographic information for each borrower was added to the data record. For each borrower/year identified in the NL database, information was extracted from the Farm and Home Plan (FHP) database for the one most relevant application file and merged with the loan summary information. Details of the steps entailed in building the data records are provided here.

The NL database provided by FSA consisted of a data record for each of 70,923 new loans originated and represented 54,984 borrowers. After excluding youth and non-program loans, 60,151 direct loans remained. Seventy-nine percent were OL, 10.2 percent were FO and 10.8 percent were EM loans. Those loans went to 45,016 borrowers, each of whom had at least one direct loan of any type. The 45,016 borrowers were unique within year but not unique across all four years. A borrower who received at least one FSA Direct loan in each of the four fiscal years would be counted four times. Each borrower was counted only once in one year even if the borrower received multiple loans in the same fiscal year. For each fiscal year, 2000–2003, information was summarized to create one record per borrower containing the number of direct loans received and the funded amount for each loan type. Those records were matched by taxpayer identification number to extract demographic information from records in a separate data file also provided by FSA. The demographic records contained information about sex, date of birth, and race/ethnicity of the borrower. One data file was created for each of the four fiscal years with the data records sorted by taxpayer identification number within each year.

The FHP data are maintained by FSA in relational database tables. To provide data for this study, each of the database tables was exported as a separate file on a state-by-state basis. Data from two tables in the FHP database were used to construct data records for analysis: (1) the application (APL) table, with each record representing a plan for a given plan year, and (2) the Classification of Borrower Account (CBA) table, with each record containing basic financial information about a borrower and matched by FIPS State-County and Plan Number to a specific plan in the APL file.

To construct the data files, each state's APL data file was input, with the restrictions that plans were from FY 1999–2003 and were classified as "current" plans. Five different kinds of plans were found in the FHP APL file: (1) Typical, (2) Current, (3) Projected, (4) Working and (5) Scenario plans. Analysis was limited to the Current plans in the APL file because they were assumed to be closely representative of the borrowers' actual financial status based on the information obtained from FSA. Individual state files were combined to generate the national APL data set that was then sorted by taxpayer identification number and plan date. The national APL data set had 117,000 observations. It was possible for a given borrower (taxpayer) to have multiple plans in a given year, and each plan could be associated with multiple loans. Each state's CBA data file was also input, combined to create a national CBA file, and then sorted by the database key identifiers, FIPS State-County and Plan Number.

The summarized NL file for each year, FY 2000–2003, was matched with the national APL file using taxpayer identification number as the unique identifier. Only one record was allowed for selection from the APL file for each taxpayer/borrower in a given year. Records were evaluated using the following criteria. (1) If a current plan(s) was filed within 365 days prior to the first loan obligation date in a fiscal year, the nearest plan before the first loan obligation date was selected. (2) If no plan was found to meet the first cri-

terion, and the borrower had multiple loans in a fiscal year, then the current plan with the closest date after the first loan obligation, but not later than the last loan obligation in that fiscal year, was selected. (3) If no current plan met either of the above two criteria, the borrower was excluded from the data set. The matched NL-APL data set was then sorted by FIPS State-County and Plan Number. The data set consisted of 29,639 borrowers for FY 2000–2003. Borrowers were unique within a year but not necessarily across years, a condition imposed on the initial NL files. The possibility also existed that a Current APL plan could be selected more than once if the borrower existed in two consecutive years and the plan met the conditions for selection in both years.

The final step was to merge the national NL-APL file with the national CBA data set, matching by FIPS State-County and Plan Number. Only those NL-APL records with matches in the CBA file were retained. A total of 10,486 borrowers in the national NL-APL file had no CBA matching records. Thus the final national NL-APL-CBA file had 19,153 borrowers with matched loan-plan-financial records. This represented 42.5 percent of the total number of borrowers identified in the NL file.

Appendix 1.D. FSA borrower financial data by loan type

Mean financials*	All loans	OL	FO	EM
Total debts/total assets	0.85	0.86	0.81	0.89
Return on assets	0.09	0.09	0.03	0.10
Current assets/current debts	1.46	1.39	2.68	0.88
Balance available/amount due this year	1.10	1.09	1.21	1.09
Median financials**				
Total debts/total assets	0.68	0.68	0.63	0.74
Return on assets	0.03	0.03	0.00	0.06
Current assets/current debts	0.71	0.70	1.11	0.40
Balance available/amount due this year	1.03	1.03	1.06	1.02
Maximum number of observations***	19,153	16,674	1,946	2,616

Source: FY 2000-2003 Sample of Farm and Home Plan
* Average for FY 2000–2003.
** Median for FY 2000–2003
*** The same maximum number of observations is used for both mean and median financials.

Appendix 2.A. Survey Sampling, Data Collection, and Data Cleaning

2.A.1. Sorting the Sampling Frame Prior to Sampling

The lists of new FSA loan originations for FY 1994–1996 were received on October 7, 2004 on a compact disc (CD) from Edward Zera of the Farm Credit Automation Office of FSA in St. Louis. The data file included one observation for each new loan originated from October 1, 1993 through September 30, 1996. Each loan origination included information on borrower's state and county of residence, social security number, loan number, assistance type, date and amount of obligation, borrower's race and gender, fiscal year of loan, fund code, and settlement code. Youth loans were included in the file. Since youth loans are not part of the analysis, they were excluded from the sampling frame. We refer to the sampling frame as the New Originator (NO) data set. *A Status of Loan and Grant Obligation's Allotments or Distributions Report* for FY 1994–1996, originating from the FSA Finance Office, was received from Kathleen Miller of the USDA/FSA Loan Making Division. This report was used to compare loan totals in the NO data set with those of the FY1994–1996 obligations for OL, FO and EM loans as stated in the Report. The Report has a total FY 1994–1996 loan count of 45,363 compared to the NO data set's total of 45,468, a difference of 105 loans.[88] The NO data set was selected as the sample frame for the purpose of drawing the FY 1994–1996 survey sample.

The NO data were imported from the CD into SAS software. The data columns were labeled and formatted using the FLP file description code that came with the CD.[89] Total observation counts in each file were then verified. The CD data set was comprised of nine loan files: one file per year for each of Operating Loan (OL) , Farm Ownership (FO) and Emergency Loans (EM). In the SAS program the three annual files for each loan type were combined into one file, resulting in three loan files_one each for OL, FO and EM. Three observations on the race variable and one observation on the gender variable had values of zero. These were deemed invalid, and the corresponding four observations (loans) were deleted from the NO file.

Because the research team was interested in getting adequate sample sizes for females and racial minorities, it was necessary to sample sub-populations at different intensities. This required sorting the observations in the NO file into three different groups for the purpose of differential sampling rates. Each individual loan obligation was classified into one of three groups, labeled as A, B and C, as a function of gender and race. The five gender codes were: 1 = male, 2 = female, 3 = family unit, 4 = organization, male-owned, 5 = organization, female-owned. The 5 race codes were: 1 = White, 2 = Black, 3 = Asian/Pacific Islander, 4 = American Indian/Alaskan Native, 5 = Hispanic. A loan was classified into group A if the sex code was 1, 3, or 4 and race code was 1. Loans in group B were associated with sex codes of 2 or 5 and race codes of 1, 2, 3, 4, or 5. Loans in group C had sex codes of 1, 3, or 4 and race codes of 2, 3, 4, or 5. This procedure resulted in three loan files by loan type with each file separated into A, B and C groups.

The OL and FO files were further segmented into beginning farmer and non-beginning farmer groups using assistance type codes Emergency loans do not have a beginning farmer program. Thus the NO sampling frame consists of five files: (1) Beginning Farm Ownership Loans (BFFO), (2) Non-Beginning Farm Ownership Loans (NONBFFO), (3) Beginning Farm Operating Loans (BFOL), (4) Non-Beginning Farm

[88] The reasons for the discrepancies are not clear. However, databases are revised and converted over time and the data in the 205 reports are not revised. As a general rule, we found in this study that strict agreement among all databases was not the typical outcome. This is not surprising since the design of the databases is complex and extracting data was similarly complex so that perfect matches are not the norm.

[89] The file description code contains state, county, social security number, loan number, assistance type, date of obligation, race, sex and fiscal year.

Operating Loans (NONBFOL), and (5) Emergency Loans (EM). Each loan in all five files was designated as belonging to group A, B or C.

2.A.2. Sampling Algorithm

The sampling frame had 45,468 observations. There were five distinct loan files: BFFO, NONBFFO, BFOL NONBFOL, and EM. Each loan type file was then subdivided by whether a loan was in the A, B, or C group. This gave fifteen (5x3) separate sub-files. For example, loan type BFFO file was classified into three sub-files where the first had all the loans in group A, the second all the loans in group B and the third all the loans in group C. Each of the fifteen sub-files was sampled as a separate entity.

Sequential sampling was used to ensure proportional sampling over time and location. In order to achieve proportionate racial, geographical, time representation in the sample, the loans were ordered within each of the fifteen groups. First, in groups B and C the loans were sorted by the race variable. Then, each of the fifteen groups was sorted by state by the states' numerical order via FIPS code. Then, within a given state, all the borrower loans were ordered by date of loan closing (making) beginning with the earliest date to the latest. This completely ordered the loans for all groups. There is the possibility of two loans being closed on the same date in the same state. If this occurred, we let the ordering of two (or more) such loans be in whatever order indicated by how the data had been entered into the data file in St. Louis. A goal of 1,000 usable responses (observations) was set. The anticipated response rate was 33 percent. We then followed a sampling scheme where loans in group (A) were sampled at a rate of 5.56 percent for NONBFOL, BFOL, and EM. That is, a random number between one and 18 was selected; then every eighteenth observation thereafter was selected. NONBFFO and BFFO loans and all loans in groups B and C were sampled at a rate of 11.1 percent. So a number between one and nine was selected, and then every ninth observation thereafter was selected. For the five A groups, the initial observations were: NONBFFO, 5; NONBFOL, 1; BFFO, 2; BFOL, 5; and EM, 10. For the five B groups, the initial observations were: NONBFFO, 1; NONBFOL, 8; BFFO, 7; BFOL, 5; and EM, 8. For the five C groups, the initial observations were: NONBFFO, 3; NONBFOL, 8; BFFO, 8; BFOL, 9; and EM, 6.

The sampling method was executed in an SAS program and resulted in 3,004 observations. An excel file was then prepared and sent to FSA in Washington, D.C. In this file, each observation (loan) had a column for state, county, social security number/ borrower identification number, and loan number. At FSA, the file was sorted by state or territory and all the loans in a given state or territory were put into a separate file. Each of these individual state borrower files was sent to each corresponding State FSA office which then sent it to the FSA field offices. The borrower identification and loan numbers guided the field staff in determining which borrower files were to be used to fill in the survey instrument.

2.A.3. Data Collection

The online survey instrument consists of 71 questions about the loan and borrower, see Appendix 2.B.1. The initial instrument was designed by the research team at the University of Arkansas Division of Agriculture. During the design process, the instrument was sent to Charles Dodson and Steven Koenig of FSA for their critical reviews. They made several constructive comments, many of which were incorporated into the design of the final instrument. In October 2004, a paper copy was taken to the field offices of Arkansas and Washington counties in Arkansas, Cherokee County in Oklahoma, and Lawrence and Dade counties in Missouri. The FLM at each county office filled out approximately five copies of the instrument as part of the pre-testing. Once this phase of the design was completed, a copy of the instrument was sent electronically to the Direct Loan Program Effectiveness Study Application (DLPESA) team in Washington, D.C. The key contacts on the

DLPESA team were Ellen Sachs, JT Taylor, and Roopa Thimmahanumaiah. Connie Holman, USDA/FSA Loan Making Division, was instrumental in coordinating activities between the University of Arkansas Division of Agriculture team and the DLPESA team through weekly teleconference calls.

The final online survey application (questionnaire) was pre-tested in five Arkansas counties (Washington, Madison, Franklin, Sebastian and Crawford) before distribution across the United States and sampled territories for actual implementation. Three University of Arkansas Division of Agriculture team members participated in the first day of pre-testing at the Washington County FSA office. The number of offices visited expanded to the other counties in the ensuing days. In these latter offices, the instrument was filled out by FSA employees on the FSA intranet computer system just as they would for actual FSA employees filling out the actual survey instruments for loans in the sample. The pre-testing was limited to Arkansas due to time constraints.[90] The pre-testing results showed that the survey questionnaire could take up to one and a half hours to complete. In addition, it became apparent that the offices could have difficulty finding all the information needed for completing the seventy-one questions. This prompted stronger wording in the letter from the Washington, D.C., FSA office to each state office stressing the importance of this survey information. During the pre-testing, it was discovered that the save/submit button occasionally malfunctioned. This was corrected by the DLPESA team in Washington, D.C., under their assumption that it was due to a time-out problem with the program.

The final version of the instrument was posted on a secure FSA intranet site. Each involved FSA County office received a letter from the National Office (through each FSA State office) explaining the importance of the study and giving instructions for accessing the online site and for filling out the online survey application. The letter also contained the list of county case and loan numbers to be surveyed in a given state.

The online survey officially began on November 22, 2004. The respondents were monitored daily by Connie Holman, Senior Loan Officer, USDA/FSA Loan Making Division, who made personal follow-ups if a state office was slow to submit their surveys from the list. She responded to various problems offices had and encouraged participation.

Each case number entered by the respondent was automatically verified against the sample list as part of the log-in procedure. This made it possible for the survey administrator to monitor saved and submitted surveys on a daily basis. This also prevented the respondents from entering a wrong case number. Subsequent to November 22, 2004, programming problems were encountered. To answer daily phone and e-mail help requests, help desks were set up and monitored by Sandy Hamm at the University of Arkansas and Connie Holman at the FSA National office. The Arkansas help desk received 93 phone calls and 69 emails during the course of the online survey. The first and most important problem was the malfunctioning of the save/submit button on the survey application. Many saved and submitted surveys were initially lost. The problem was discovered on the first day of the online survey. An email alerting users to this problem was sent by Connie Holman of the Loan Making Division to the State offices giving instructions to first adjust browser settings; and then if that did not work, to print and fax the complete survey to Connie Holman at the National office. One hundred sixteen surveys were faxed and entered into the online survey application by Connie Holman. These "handwritten" entries were later ver-

[90] All parties involved in the design phase of the survey believed it was important to complete the survey by December 31, 2004. It was further recognized that the response after December 24 was likely to be light. It was assumed any marginal improvements in design and implementation would likely result in lower response and less overall accuracy if this December 31 deadline was not observed.

ified for entry accuracy at the University of Arkansas Division of Agriculture. During the first week, the county offices continued to have difficulties with the ability to save and submit the application. A second issue arose about the inability to enter negative numbers into the application. On Friday, November 27, 2004, a "hot fix"[91] was implemented to correct these two major issues. This fix corrected the problem with entering negative numbers. It helped but did not completely fix the save/submit problem.

On December 10, 2004, the survey administrator's report, which allowed Connie Holman to view the saved and submitted survey applications for each state, began to report faulty numbers. A number of the completed surveys were listed on the report as saved, but had actually been submitted into the database as final entries by the county offices. This impaired the ability of the administrator (Ms. Holman) to monitor successful completion of the survey. Nonetheless, a total of 2,767 responses were collected during the period of November 22, 2004, through December 17, 2004. After verification of the "faxed surveys", an additional 10 surveys that were faxed were added to the database resulting in a final count of 2,777 surveys received. The final data download from DLPESA was received by the Arkansas research team on December 21, 2004.

2.A.4. Data Cleaning

The final survey data set transmitted from FSA in Washington D.C. contained 2,767[92] observations, which corresponded to the same number of responses. Thirteen observations were found to have cells that did not meet the variable criteria. It was not possible to determine which cells the entries corresponded to so these observations were designated as unusable. These observations are believed to have been the result of the malfunctioning save/submit button. One additional observation had an assistance code for an Indian land acquisition, which does not meet the direct loan criteria for this study. This was considered a wrong entry made by the FLM filling out the survey and the observation was deleted. Another 48 observations were removed from the data set because they had either application or farm and home plan dates that did not fall within the applicable FY 1994–1996 date range, which implied either a data entry error or the use of forms not relevant to the loan that had been originated within the FY 1994–1996 window. These procedures resulted in 62 observations being deleted from the original survey data set for a total of 2,715 usable responses.

Even though a survey instrument was accepted as usable, it did not mean all the observations on all variables were accepted as usable. Observations on variables that were not in the criteria range for a given question were set to missing. These outliers can be explained by either data entry error or misinterpretation of the survey question. Since it is likely that the respondent had a data entry error on only some of the survey questions, the responses to the other questions were kept while the entry in question was set to missing.

Upon close inspection and use of simple descriptive statistics[93] on each variable, several data anomalies were discovered. The two variables debt-to-asset ratio (question 64 on the survey) and the current ratio (question 65 on the survey) were found to have outliers in the data set. If the reported current ratio was greater than 1,000 or the debt-to-asset ratio was greater than 500, the observations on those variables were set to missing. Then, if both the debt-to-asset and current ratios for an observation were greater

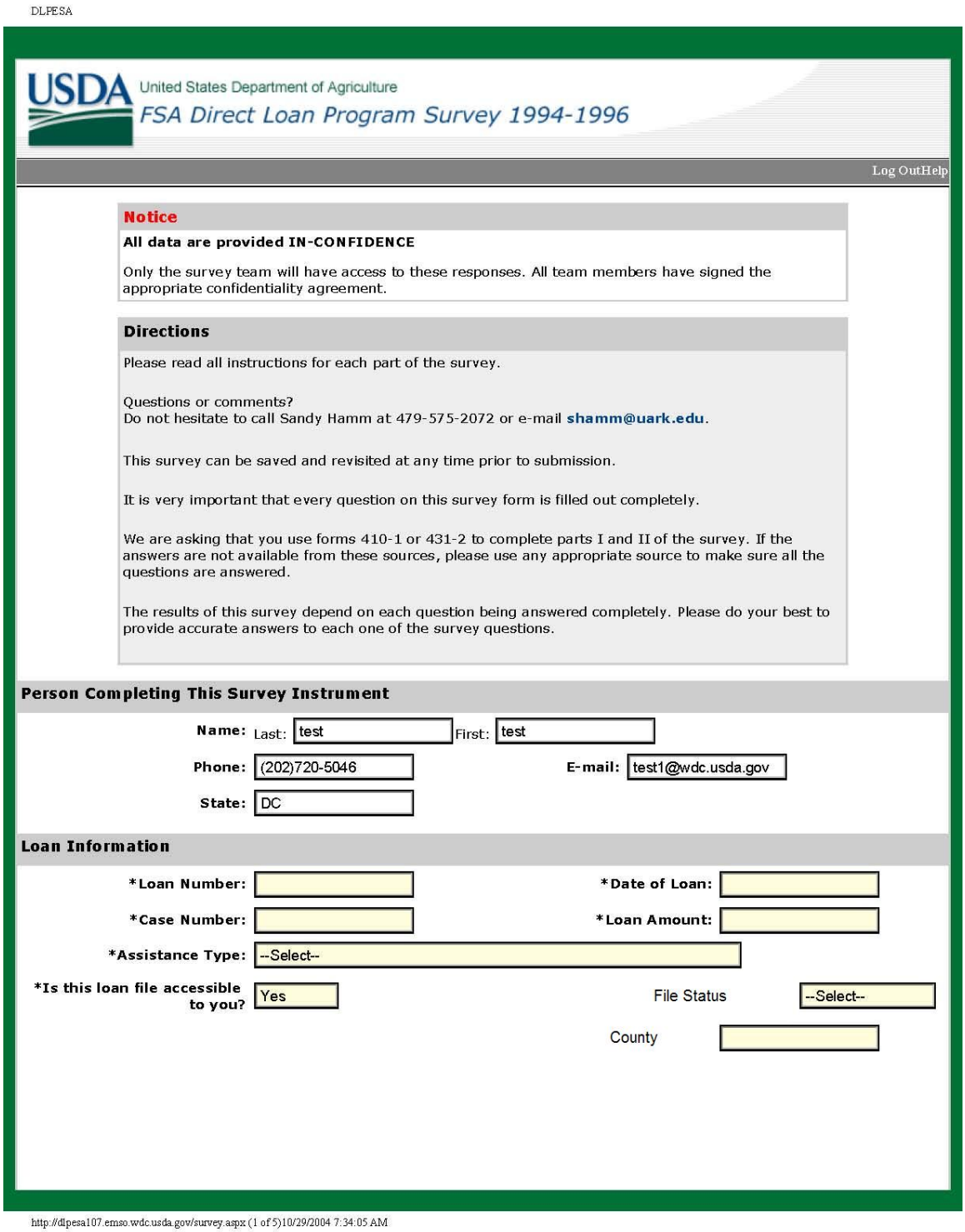
[91] A 'hot fix" is a term used by DPLESA that means the team provided a quick fix to the problem and put the application back on line without field testing.
[92] This number includes only the surveys that were transmitted electronically. It does not reflect the additional ten faxed surveys that were manually entered.
[93] Descriptive statistics used include means, standard deviations, minimum, and maximum values.

than 10, the variables were divided by 100. Otherwise, the variables were set to missing. The observations for the ratios in questions 64 and 65 did not necessarily come directly off a Farm and Home Plan. Since the ratios did not necessarily come from a defined source, they are subject to error and larger variation. If the years of farm operation experience exceeded the age of the applicant, years of farm operation experience was set to missing.

The final total number of remaining usable observations is 2,715, which is equivalent to a response rate of 90 percent. Based on the experience of the University of Arkansas research team, this is an unusually high response rate. This is a tribute to the various personnel at FSA who adapted the survey instrument to the computer and made the application user-friendly as well as those personnel who assisted in the administration of the survey. Certainly, a key factor in the success of the survey was the prompting of state offices by FSA National office in Washington D.C. and, subsequently, State offices prompting field offices to encourage field participation. Obviously, the participation and dedication of the FLMs and their staffs were greatly appreciated by the research team.

Appendix 2.B. Survey Instrument and Drop Down Codes

2.B.1. The Survey Instrument


DLPESA

USDA United States Department of Agriculture

FSA Direct Loan Program Survey 1994-1996

Log OutHelp

Notice

All data are provided IN-CONFIDENCE

Only the survey team will have access to these responses. All team members have signed the appropriate confidentiality agreement.

Directions

Please read all instructions for each part of the survey.

Questions or comments?
Do not hesitate to call Sandy Hamm at 479-575-2072 or e-mail **shamm@uark.edu**.

This survey can be saved and revisited at any time prior to submission.

It is very important that every question on this survey form is filled out completely.

We are asking that you use forms 410-1 or 431-2 to complete parts I and II of the survey. If the answers are not available from these sources, please use any appropriate source to make sure all the questions are answered.

The results of this survey depend on each question being answered completely. Please do your best to provide accurate answers to each one of the survey questions.

Person Completing This Survey Instrument

Name: Last: test First: test

Phone: (202)720-5046 **E-mail:** test1@wdc.usda.gov

State: DC

Loan Information

***Loan Number:** ***Date of Loan:**

***Case Number:** ***Loan Amount:**

***Assistance Type:** --Select--

***Is this loan file accessible to you?** Yes File Status --Select--

County

http://dlpesa107.emso.wdc.usda.gov/survey.aspx (1 of 5)10/29/2004 7:34:05 AM

DLPESA

Survey Part I

Please use information from application form 410-1, or other appropriate resources for this loan only. Be sure to record answers as accurately as possible. *Information requested below is for this loan only, at time of application.*

			Unknown
1.	**Applicant's Age (years)**		☐
2.	**Applicant's Number of Household Members**		☐
3.	**Acres Owned**		☐
4.	**Acres Rented**		☐
5.	**Marital Status**	--Select--	☐
6.	**Has the applicant or any member of the proposed entity ever been in receivership, been discharged in bankruptcy, or filed a petition for reorganization in bankruptcy?**	--Select--	☐
7.	**Has this borrower or any member of an entity ever obtained a direct loan or guarantee from Farmers Home Administration?**	--Select--	☐
	7a. Was the loan paid in full?	--Select--	☐
8.	**Was the loan debt settled or was the applicant ever released from personal liability as part of a debt settlement action?**	--Select--	☐
9.	**Has this applicant been delinquent on any Federal Debt?**	--Select--	☐
10.	**Is the applicant farming or ranching now?**	--Select--	☐
11.	**Number of years experience operating a farm?**		☐
12.	**Date Application Complete (mm/dd/yyyy)**		☐
13.	**Race**	--Select--	☐
14.	**Gender of primary applicant**	--Select--	☐

Survey Part II

For this section, please use information from the Farm and Home Plan 431-2, or other appropriate sources at the time of loan application. Information is for this loan only. The Farm and Home plan figures should most accurately reflect the borrower's financial position at the time of loan application.

Part A, Farm & Home Plan, Balance Sheet

			Unknown
15.	**Date of this Farm and Home Plan (mm/dd/yyyy)**		☐

Please report amount listed for questions 16-34.		Amount	Unknown
16.	**Total Current Farm Assets**		☐
17.	**Total Intermediate Farm Assets**		☐
18.	**Total Long Term Farm Assets**		☐
19.	**Total Farm Assets**		☐

DLPESA

20.	**Total Current Farm Liabilities**		☐
21.	**Total Current FSA Farm Liabilities ***		☐
22.	**Total Intermediate Farm Liabilities**		☐
23.	**Total Intermediate FSA Farm Liabilities ***		☐
24.	**Total Long Term Farm Liabilities**		☐
25.	**Total Long Term FSA Farm Liabilities ***		☐
26.	**Total Farm Liabilities**		☐

* Please add all FSA loans together.

27.	**Total NonFarm Assets**		☐
28.	**Total Assets**		☐
29.	**Total NonFarm Liabilites**		☐
30.	**Total Liabilites**		☐
31.	**Net Worth**		☐
32.	**Total Liabilities and Net Worth**		☐

Part B, Farm & Home Plan, Rental and Lease Information

For this section, please use information from the Farm and Home Plan 431-2, or other sources. Please use first full years farming plan for this loan only at time of loan making.		**Amount**	**Unknown**
33.	**Total Acres**		☐
34.	**Total Crop Acres**		☐

Survey Part II (continued)

For this section, please use information from the Farm and Home Plan 431-2, other sources, or first cash flow statement for a full years plan for this loan only.

Part J, Farm & Home Plan, Summary of Year's Business

Please record planned expenses for the first full year of farming.		**Planned Expenses**	**Unknown**
35.	**Crop Income**		☐
36.	**Livestock Income**		☐
37.	**Other Farm Income**		☐
38.	**Total Cash Farm Income**		☐

DLPESA

39.	**Total Cash Farm Operating Expense**		☐
40.	**Net Farm Cash Income**		☐
41.	**Non-farm Income**		☐
42.	**Total Net Cash Farm & Non-farm Income**		☐
43.	**Cash Family Living Expense**		☐
44.	**Net Cash Income**		☐
45.	**Cash Carry-Over**		☐
46.	**Loans and Other Credit**		☐
47.	**Interest**		☐
48.	**Total Available**		☐
49.	**Capital and Carry-over Expenses**		☐
50.	**Balance Available**		☐
51.	**Gross Cash Income**		☐

Part K, Farm & Home Plan, Debt Repayment

Please fill in **Total** amount only.		**Amount**	**Unknown**
52.	**Total Amount Due This Year Principal and Interest**		☐
53.	**Total Planned Principal and Interest To Be Paid**		☐

Survey Part III-A

This information is for this loan only.			**Unknown**
54.	**Was this loan paid in full?**	--Select--	☐
	54a. What was the date of pay off? (mm/yyyy)		☐
	54b. Was this loan paid of with conventional credit or FHA guaranteed credit?	--Select--	☐
55.	**Was(has) this loan ever(been) restructured?**	--Select--	☐
	55a. What was the first date of restructuring? (mm/yyyy)		☐
56.	**Did(has) this loan experience(ed) a debt write down?**	--Select--	☐
	56a. What was the date of the first write down? (mm/yyyy)		☐
	56b. What was the amount of loss?		☐
57.	**Did this loan terminate due to foreclosure, bankruptcy, or debt write off?**	--Select--	☐

DLPESA

	57a. What was the date? (mm/yyyy)		☐
	57b. What was the amount of loss?		☐
58.	**Number of active direct OL loans***		☐
59.	**Number of active direct FO loans***		☐
60.	**Number of active direct EM loans***		☐

* At the time of this loan's origination.

Survey Part III-B

Information for this section pertains only to the **present status** of this borrower. **Unknown**

61.	**Does this borrower still have one or more active direct FO or OL loans?**	--Select--	☐
62.	**Please list the most current loan number for this borrower.**		☐
63.	**What is the borrower's most recent net worth?**		☐
	63a. What is the date of this entry? (mm/yyyy)		☐
64.	**What is the borrower's most recent total debt/total asset ratio?**		☐
	64a. What is the date of this entry? (mm/yyyy)		☐
65.	**What is the borrower's most recent current ratio? (current assets/current liabilities)**		☐
	65a. What is the date of this entry? (mm/yyyy)		☐
66.	**Total number of loan originations for this borrower since 10-01-1996.**		☐
67.	**Total number of restructured loans for this borrower since 10-01-1996.**		☐
68.	**Total number of times this borrower has written down debt since 10-01-1996.**		☐
69.	**Total number of times this borrower has been delinquent since 10-01-1996.**		☐
70.	**If the borrower does not have any current active loans when was the final FSA debt terminated? (mm/yyyy)**		☐

71. Please choose the most likely reason why this borrower exited the FSA Farm Loan Program

--Select-- ☐

Cancel Save Submit

***Required fields**

Appendix Table 2.B.2. Alternatives in survey drop down boxes

Question	Value	Description
Loan #	Text	
Case #	Text	
Loan date	Date	MM/DD/YYYY
Loan amount	Numeric	
Assistance type		See assistance ID and code in appendix table 2.B.3.
File accessible	0	Select
	1	Yes
	2	No
File status ID	0	Select
	1	In state office
	2	Destroyed
	3	Changed counties
Which county	Text	
Q1	Numeric	
Q2	Numeric	
Q3	Numeric	
Q4	Numeric	
Q5	0	Select
	1	Married
	2	Separated
	3	Unmarried
	4	Unknown
Q6	0	Select
	1	Yes
	2	No
	3	Unknown
Q7	0	Select
	1	Yes
	2	No
	3	Unknown
Q7a	0	Select
	1	Yes
	2	No
	3	Unknown
Q8	0	Select

Appendix Table 2.B.2. Continued.

Question	Value	Description
	1	Yes
	2	No
	3	Unknown
Q9	0	Select
	1	Yes
	2	No
	3	Unknown
Q10	0	Select
	1	Yes
	2	No
	3	Unknown
Q11	Numeric	
Q12	Date	MM/DD/YYYY
Q13	0	Select
	1	American Indian/Alaskan Native
	2	Asian/Pacific Islander
	3	Black
	4	Hispanic
	5	White
	6	Other
	7	Unknown
Q14	0	Select
	1	Male
	2	Female
	3	Family Unit
	4	Organization – Male owned
	5	Organization –Female owned
	6	Public Body
	7	Unknown
Q15	Date	MM/DD/YYYY
Q16-53	Numeric	
Q54	0	Select
	1	Yes
	2	No
	3	Unknown
Q54a	Date	MM/YYYY
Q54b	0	Select
	1	Yes
	2	No
	3	Unknown
Q55	0	Select
	1	Yes
	2	No
	3	Unknown

Appendix Table 2.B.2. Continued.

Question	Value	Description
Q55a	Date	MM/YYYY
Q56	0	Select
	1	Yes
	2	No
	3	Unknown
Q56a	Date	MM/YYYY
Q56b	Numeric	
Q57	0	Select
	1	Yes
	2	No
	3	Unknown
Q57a	Date	MM/YYYY
Q57b	Numeric	
Q58-60	Numeric	
Q61	0	Select
	1	Yes
	2	No
	3	Unknown
Q62	Numeric	
Q63	Numeric	
Q63a	Date	MM/YYYY
Q64	Numeric	
Q64a	Date	MM/YYYY
Q65	Numeric	
Q65a	Date	MM/YYYY
Q66-69	Numeric	
Q70	Date	MM/YYYY
Q71	0	Select
	1	Continued farming and graduated to FSA guaranteed credit sources
	2	Continued farming and graduated to conventional non-FSA credit sources
	3	Continued farming and no longer needed credit
	4	Left farming involuntarily (other than retirement)
	5	Retired from farming
	6	Left farming involuntarily (other than death)
	7	Death
	8	Unknown

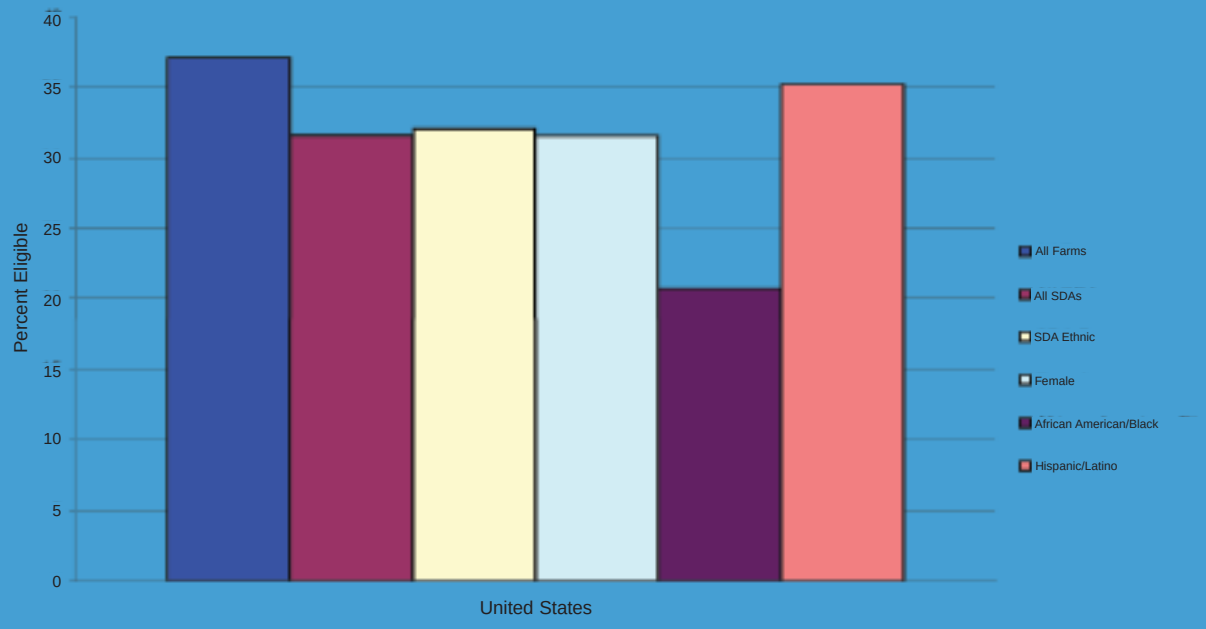
Appendix Table 2.B.3. Assistance ID and codes for FY 1994 – 1996 FSA loans

Assistance ID	Codes
30	FO-FE-Limited Resource-SDA-Ethnic
31	FO-FE-Regular-SDA-Ethnic
34	FO-FE-Limited Resource
35	FO-NFE-Limited Resource
36	FO-FE-Regular
37	FO-NFE-Regular
38	Soil and Water
40	Grazing Land - Association
42	Indian Land - Acquisition
43	Indian Land - Acquisition - Limited Resource
44	FO-NFE-Regular-SDA-Ethnic
47	OL-Limited Resource-Delinquent Borrower
50	OL-Limited Resource-7 Year
51	OL-Regular (Except Youth) -7 Year
56	EM-Actual Loss-Real Estate Purposes
60	EM-Citrus Grove-Rehabilitation/Reestablishment
92	EM-Actual Loss-Operating Purpose
102	OL-Limited Resource-Delinquent Borrower-SDA
104	OL-Regular (Except Youth)-1 Year-SDA
105	OL-Limited Resource-7 Year-SDA
106	OL-Regular(Except Youth)-7 Year-SDA
109	Soil and Water-Limited Resource
110	Farm Ownership Credit Sale
112	OL-Regular (Except Youth)-1 Year
117	OL-Limited Resource-1 Year
119	OL-Limited Resource-1 Year-SDA
124	FO-FE-Regular-SDA-Gender
125	FO-FE-Limited Resource-SDA-Gender
126	FO-NFE-Regular-SDA-Gender
200	FO-FE-Beginning Farmer-Down Payment
201	FO-FE-Beginning Farmer-Down Payment-SDA-Ethnic
202	FO-FE-Beginning Farmer-Down Payment-SDA-Gender
203	FO-FE-Beginning Farmer-Regular
204	FO-FE-Beginning Farmer-Limited Resource
205	FO-FE-Beginning Farmer-SDA-Ethnic
206	FO-FE-Beginning Farmer-SDA-Gender
207	FO-FE-Beginning Farmer-Limited Resource-SDA-Ethnic
208	FO-FE-Beginning Farmer-Limited Resource-SDA-Gender
209	OL-Beginning Farmer-Regular-1 Year
210	OL-Beginning Farmer-Regular-1 Year-SDA
211	OL-Beginning Farmer-Regular-7 Year
212	OL-Beginning Farmer-Regular-7 Year-SDA
213	OL-Beginning Farmer-Regular-Special Assistance-1 Year
214	OL-Beginning Farmer-Regular-Special Assistance-1 Year-SDA
215	OL-Beginning Farmer-Regular-Special Assistance-7 Year
216	OL-Beginning Farmer-Regular-Special Assistance-7 Year-SDA

Appendix Table 2.B.3. Continued.

Assistance ID	Codes
217	OL-Beginning Farmer-Limited Resource-1 Year
218	OL-Beginning Farmer-Limited Resource-1 Year-SDA
219	OL-Beginning Farmer-Limited Resource-7 Year
220	OL-Beginning Farmer-Limited Resource-7 Year-SDA
221	OL-Beginning Farmer-Limited Resource-Special Assistance-1 Year
222	OL-Beginning Farmer-Limited Resource-Special Assistance-1 Year-SDA
223	OL-Beginning Farmer-Limited Resource-Special Assistance-7 Year
224	OL-Beginning Farmer-Limited Resource-Special Assistance-7 Year-SDA

Farm Service Agency Direct Farm Loan Program Effectiveness Study



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