EVALUATING THE RELATIVE EXTENT OF DOUBLE MINORITY BIAS IN FARM SERVICE AGENCY'S LENDING TERMS

by

JYOTSNA N. GHIMIRE

(Under the Direction of Cesar Escalante)

ABSTRACT

The United States Department of Agriculture Farm Service Agency, hereafter, FSA provides credits to farmers, who are, in general, less likely to be competitive enough to obtain commercial loans from traditional lenders. There have been some cases where FSA lending terms were suspected to have been biased against double minority borrowing groups, such as female borrowers belonging to ethnic minorities. This study investigates the extent of any bias in FSA's lending terms, arising from borrowers' double minority classifications, such as Black or African American females, Hispanic or Latino females, Asian females, and Native American females. It also analyzes how the combinations of lending terms prescribed by the FSA lending officers to borrower groups affect the resulting profitability and net cash position after debt servicing. We find that FSA lending terms seem to be less favorable to double minority groups and this unfavorable lending terms result into weak financial performance of double minority groups.

INDEX WORDS: United States Department of Agriculture Farm Service Agency (FSA), Lending term bias, Double minority groups, Profitability

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JYOTSNA N. GHIMIRE

B.A., Tribhuvan University, Nepal, 2003

M.A. Tribhuvan University, Nepal, 2006

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JYOTSNA N. GHIMIRE

Major Professor: Cesar Escalante

Committee: Craig Landry
Wojciech J. Florkowski

Electronic Version Approved:

Suzanne Barbout
Dean of the Graduate School
The University of Georgia
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CHAPTER 1

INTRODUCTION

1.1 Background

Farmers in the United States face a number of constraints, including financial, operating, and technical constraints to invest in farm-related activities. Access to credit plays a crucial role in eliminating farmers' financial constraints. Previous studies have indicated that credit constraints affect farm-related activities, such as farmers' decision to invest or produce (Barrett et al., 2010; Karlan et al., 2014). In a well-functioning market, financial market supplies the financial needs of agents, including farmers. However, in some cases, the market fails to provide necessary financial assistance to farmers. Limited supply of credit funds by private lenders and their risk aversion strategies, in general, restrict credit access to those with favorable credit history and sufficient collateral asset value (Escalante et al., 2005). These practices conform to the credit rationing (to address limitations of funding availability) and credit risk management techniques which is also known as credit risk assessment, the evaluation ensuring that loanable funds are provided only to deserving, more creditworthy, less risky borrowers.

In credit risk assessment process, commercial lenders calculate a credit score for each borrower based on the borrower's historical financial performance measures (Wu et al., 2011). Hence, borrowers with lower credit history and asset value are automatically disqualified to

obtain credit supplied by traditional financial institutions and commercial lenders, such as banks and other financial institutions. This situation gets worse when the borrowers belong to minority groups, such as women or ethnic minority for a number of reasons. First, these minority borrowers are usually preconceived as a high-risk borrower by commercial lenders due to some generalized notion of their financial inferiority perhaps validated from previous encounters with borrowers having similar minority classifications. Second, these minority borrower groups tend to have insufficient net worth and operate smaller businesses that lenders immediately regard as a demerit in their credit risk appraisal models. Furthermore, for women, the lenders tend to have fixated perceptions of their subordinate role in the farm, and accordingly disqualify them from borrowing loans (Escalante et al., 2009).

The federal government in the United States has a long history of assisting farmers in supplying credit to agricultural activities. The United States Department of Agriculture Farm Service Agency (USDA FSA), the agency that broadly oversees farming and forestry issues in United States, offers loans to farmers and ranchers, in general, and those who are unable to obtain commercial credits from traditional financial institutions, such as commercial banks, cooperatives, and other financial institutions, in particular because farmers and ranchers from these groups typically operate smaller farms, have less equity, or lack of a sufficient credit or production history. FSA delivers direct loans to family farmers as a temporary source of agricultural credit where loans are made and serviced by FSA and guaranteed loans serviced by commercial lenders but guaranteed by FSA (Dodson et al., 2006). Hence, it bridges the gaps in the commercial credit market by providing loans to family-sized farms that are unable to obtain credits from traditional financial institutions such as commercial banks, cooperatives, and other

financial institutions. For instance, over one-third of credit used by U.S. agriculture comes from combined federal agencies and government-sponsored enterprises (Dodson and Koeing, 2003).

The USDA FSA loan program also places special emphasis on providing loans to beginning farmers and those belonging to minority groups such as women and racial or ethnic minorities, who, in some cases, have been reported to be prejudiced by commercial lenders based on their gender or race or ethnicity. The lending guidelines of FSA loan program emphasize the direct loan to be highly targeted to these socially disadvantaged (SDA) or beginning farmers than guaranteed loan programs. In FY 2010, more than 50 percent of all loans were issued to beginning, minority, and women farmers, and this loan accommodation translates into greater than $1.975 billion in loan assistance (USDA FSA, 2012). Under guaranteed loan, a commercial lender such as banks, the Farm Credit System, credit unions and other non-traditional lenders make and service the loans, and the USDA FSA guarantees up to 95% of the lender's losses on the loan. USDA FSA is, thus, considered lender of the last resort for farmers, in general, and small and minority farmers, in particular in the United States.

Although USDA FSA has accommodated many farmers, who are, in general, less likely to be competitive enough to obtain commercial loans from traditional financial institutions, there have been some cases where USDA FSA lending terms were suspected to have been biased against certain minority borrowing groups, such as females and ethnic minorities. For instance, Escalante et al. (2017) found that FSA lending terms, in general, favor Whites and male farmers; the loans these borrowers received from FSA were charged lower interest rates compare to their counterparts. Likewise, Dhakal et al. (2019) found that FSA lending terms for ethnic minorities tend to be less favorable in larger loan borrower category. However, previous studies conducted

on the FSA lending biases have focused solely on either the race or gender factor. To our knowledge, there has never been any study in agricultural finance literature that have analyzed if the FSA vary its lending terms to borrowers with double minority classifications. Examples of borrowers with double minority classifications are female borrowers belonging to racial or ethnic minority groups - African American female, Hispanic American female, Asian American female, and Native American female.

1.2 Statement of the Problem

Although USDA FSA is considered "lender of the last resort" to farmers who have difficulty obtaining credits from commercial lenders, especially borrowers classified as financially and socially disadvantaged, the agency has been plaintiff in a number of lawsuits based on allegations of racial and gender discriminations in its lending terms. For instance, the Pigford versus Glickman was a landmark class action lawsuit filed by African American farmers, alleging the existence of various forms of unfair lending practices to Black or African American farmers, such as higher probability of denial of loan applications, longer processing times, understated projected crop yields and eventually loan rejections (Bennett, 2001; Vina & Cowan, 2005). Likewise, female farmers alleged the existence of gender bias in USDA FSA's lending terms, the case spearheaded by the Love versus Vilsack, alleging USDA FSA's discriminatory lending terms to female farmers (Dunne, 2006; Fox, 2006).

In agricultural finance literature, a number of studies have investigated patterns of biased decisions made by the USDA FSA in packaging loan terms, but these studies have adopted singular minority attributes whereby racial and gender minority labels were taken up separately. For instance, Wu et al. (2012) find substantial differentials in approved loan amount gaps

between racial or gender classes, favoring White and female borrowers. Likewise, Escalante et al. (2017) report certain trends in the USDA FSA lending officers' loan packaging decisions for minority groups, such as woman farmers and farmers belonging to racial minority groups, whereby these borrowers are charged higher rate of interests, providing less amount of loans, and also providing shorter loan maturity period. In a most recent study, Dhakal and Escalante (2019) find that USDA FSA's lending terms favor male borrowers by providing larger loan amounts and also longer loan maturity periods, compared to female borrowers. This study is based on the contention that if the USDA FSA's decisions on lending terms have been favored certain borrower groups with a singular racial or gender label, the "bias" could possibly be more evident for loan term packaging decisions for borrowers with double (combined) minority labels, such as Black or African American females, Hispanic or Latino females, Asian females, or native American females, compared to White female borrowers. Such "bias" tendency could negatively impact profitability and net cash position of the farm owners. However, the mainstream literature in agricultural finance has, in general, not adequately exhausted this in its examination of the lending "bias" issue.

1.3 Purpose of the study

Existing research on lending discrimination in USDA FSA lending practices has overwhelmingly focused on whether Black or African American borrowers are more likely to be denied for credit than their peer White borrowers. This study provides a different perspective in investigating the extent of any bias in USDA FSA's lending terms, arising from borrowing farmers' double minority classifications, such as Black or African American females, Hispanic or Latino females, Asian females, and Native American females. Three indicators – loan amount, interest rate, and

loan maturity – will be used to discern the existence of any bias that USDA FSA's lending officers could have been dealing with borrowers with double minority labels in relation to White female borrowers. It also analyzes how the combinations of interest rate and loan maturity periods prescribed by the FSA lending officers to borrower groups affect the resulting profitability and net cash position after debt servicing.

1.4 Policy Relevance

Previous studies have validated that USDA FSA lending practices tend to result in less favorable lending terms approved for minority groups such as women or ethnic minorities (Escalante et al., 2009). The gravity of possible lending bias directed towards borrowers with double minority labels has largely been unexplored in agricultural finance literature. Hence, findings of this study will have significant contributions to academic, institutional, and policymaking audiences with interest in improvement in race and gender relations as well as the more equitable promotion of significant credit access and more effective credit delivery services for all borrowers, regardless of race and gender attributes. Specifically, the findings of this study will be valuable inputs for USDA FSA, whose mission is also to support smaller farmers not having adequate equity or sufficient credit or production history, to understand if discriminatory lending practices still exist in its lending practices. Based on the findings, necessary policy can be formulated to curb irregularities in FSA lending terms decisions and mitigate the effects of such decisions on minority borrowers, especially those with double minority labels. Adopting this policy may also help reduce poverty as double minority groups are, in general, poor, compared to their respective counterparts (Status of Women, 2019).

1.5 Organization of the Study

Following this Introduction Section, Chapter 2 reviews and summarizes existing literature related to this study providing background knowledge on the USDA FSA continuous support to the United States agricultural industry. Chapter 3 introduces methods to analyze if the USDA FSA lending terms differentiate double minority groups – female borrowers belonging to racial or ethnic minorities. Chapter 4 reports the findings, Chapter 5 discusses results, and Chapter 6 concludes this study.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview of USDA FSA Lending Program

The USDA Farm Service Agency, hereafter FSA was established in 1930 although it was officially named to the Farm Service Agency (FSA) in 1996. Since then, it has provided invaluable support to United States agriculture producers by delivering timely, effective programs and services to farmers and ranchers to support them in sustaining the agricultural economy, as well as providing first-rate support for domestic and international food aid effort (USDA FSA, 2016). While FSA is committed to support to all farmers and ranchers, it also focuses on supporting the credit needs of beginning, minority, and female farmers as farmers and ranchers from these groups typically operate smaller farms, have less equity, or lack sufficient credit or production history. Hence, the agency's farm loam programs provide loans to those who are unable to obtain farm credits from conventional sources, such as commercial banks and other financial institutions at equitable rates and terms (USDA FSA, 2019).

The FSA has five mission areas: farm programs, farm loans, commodity operations, management, and state operations. Among these areas, the FSA's Farm Loan Programs offer opportunities to family-sized farmers and ranchers to start, improve, expand, transition, market, and strengthen family farming and ranching operations placing special emphasis for the

beginning farmers, racial and ethnic minority farmers and women farmers. Every year FSA sets aside some funds specifically to help beginning and socially disadvantaged farmers. The FSA defines beginning farmers are those who has operated a farm less than ten years, do not have a farm or ranch greater than 30 percent of the average size farm in their county, meet all the FSA loan eligibility requirements and contribute substantially in the operation of the farm. The 1990 Farm Bill defines a socially disadvantaged farmer or rancher is the one who has been subjected to racial, ethnic, or gender prejudice because of their identity as a member of the group without regard to their individual qualities (United States Congress, 1990).

Broadly speaking, FSA has two types of programs to support eligible borrowers – guaranteed loan program and direct loan program. The objectives of both - direct and guaranteed loan programs are to facilitate its borrower's graduation towards commercial credits. In other words, FSA credit assistance is not designed to assist farmers throughout the entire lifespan of their businesses. FSA assistance is designed to allow farmers to accumulate valuable business experience and track record up to the level that they would have the confidence and credibility to compete with other regular borrowers for loanable funds. The direct loan is made and serviced by FSA using government money to jumpstart farm business to the high-risk borrowers who do not meet the qualifications for a loan guarantee from commercial lenders. Direct loans can be used to finance short-term operating needs and longer-term capital expenditures and FSA has the responsibility of providing credit counselling and supervision to its direct borrowers by making through assessment of their farm operations (Benefit Finder, 2019). Direct borrowers are expected to eventually graduate to the guaranteed loan program and deal with commercial lenders through FSA's guarantee of their credit responsibility. Some direct borrowers' business can grow and mature at a much faster rate that they can bypass the guaranteed loan program and

move on to have a direct relationship with commercial lenders. Eligible applicants may obtain maximum amount of direct loan up to $300,000 per borrower. In contrast, guaranteed loans are made and serviced by commercial lenders. FSA makes sure that the terms and conditions of lending/borrowing credit is reasonable to both parties involved. For FSA's guaranteed loans, the maximum loan size per borrower is $1,399,000 adjustable annually based on inflation. Once the farmer is able to obtain credit from commercial lenders without any involvement of government, the agency's mission of providing temporary supervised credit is achieved (USDA FSA, 2018).

Under the direct loan program, FSA has a number of loan types: farm ownership loan, operating loan, emergency loan, conversation loan, and land contract guarantees. The farm ownership loan can be used to purchase farmland, make farm improvements, or promote soil and water conservation. Operating loans can be used to purchase livestock, farm equipment, feeds, seeds, fuels, insurance, or other operating expenses. Operating loans can also be used to pay for minor improvements to buildings, cost associated with land and water development, and to finance debts under certain circumstances (Sustainable Agriculture, 2019). Emergency loans are designed to help farmers who suffered a qualifying loss caused by natural disaster damaging farming or ranching operation. Emergency loans may be used to restore or replace essential property, pay production costs for the disaster year, and pay basic family living expenses. Conservation loans are targeted to complete an approved conservation plan. Land contract guarantees provides certain financial guarantee to the seller of a farm through a land contract sale to a beginning or socially disadvantaged farmers.

2.2 Review of Literature

In corporate finance literature, possible lending bias associated with borrowers' double minority labels (i.e., a female borrower with a racial minority affiliation) has been analyzed. For instance, Cheng, Lin, and Liu (2015) found that Black or African American borrowers, on average, pay about 29 basis points more than comparable White borrowers and Black women seem to receive much more disparate treatment than Black men. They also reported that Black or African American female borrowers were charged 26.5 basis points more in interest rates compared to White female clients in the same credit risk category. A similar connection between lending biases and race of the borrowers was found by Blanchflower et al. (2003), suggesting that Black or African American borrowers are far more likely to report problems with credit availability. They also suggested that Black or African American-owned small businesses are almost three times more likely to have their loan applications denied and they pay higher interest rates to approved loans. In general, women borrowers from subordinate ethnic group with high level of income were perfect customers of subprime loans offered by large banks and financial institutions. This is basically true as subprime loans, while risky, were tremendously profitable for the banks when the homeowners didn't foreclose.

Analyzing potential discrimination on the FSA's lending terms is relatively a new area of research in agriculture finance. Although much attention has been devoted to the study of racial and gender discrimination issues, very few studies have focused on minority borrowers, in particular, women, who are unfairly treated through lenders prejudiced decisions. Using FSA lending data between 2004 and 2014 and employing Seemingly Unrelated Regression (SUR) techniques, Escalante et al. (2017) analyzed if FSA lending practices differentiate socially

disadvantaged groups, such as female and racial minorities. They found that although there are no significant disparities between loan amounts and maturities prescribed for gender and racial minorities, Nonwhite male and female borrowers were usually charged higher interest rates than their respective counterparts.

Wu et al. (2012) provide a review of empirical literature on racial and gender variations in FSA's lending terms using FSA's lending data between 1999 and 2002. They employed the Oxaca-Blinder decomposition method to analyze the disparities in approved loan amounts and found a substantial difference in the loan amount between racial and gender classes, favoring White female borrowers. However, they pointed that since the White female borrowers significantly dominate their peer group in a number of measures that indicate their financial strengths and relatively greater capability to repay the loans, their study cannot be used as an evidence of FSA's lending bias.

In another study, Escalante et al. (2009) examined the courts' denial of women farmers' motion for class-action certification of their lawsuits alleging gender discrimination in FSA lending decisions. Using sample data of Georgia FSA borrowers between four-year period (1999 to 2002), they used logistic regression approach to analyze the loan approval among gender and racial minority female borrowers. Their findings suggest that there is no overwhelming evidence of gender bias in FSA loan approval decisions among Georgia FSA farm loan applicants. In a most recent study, Dhakal et al. (2019) analyzed discriminatory lending practices in FSA lending decision, using FSA lending data between 2004 and 2014 and employing Finite Mixture Model. They found that Nonwhite farm borrowers tend to receive larger loans among those in the lower loan latent class but receive relatively lower loans in the larger loan borrower category. These

farmers are also charged higher interest rates vis-à-vis their peers in both the low and high interest rate latent class. They also reported that male borrowers are associated with larger loan amounts and longer maturity periods than female borrowers.

The foregone review of empirical studies indicates that less favorable FSA lending terms are usually approved for minority groups, such as female and ethnic minorities. Using FSA lending data between 2004 and 2014, this study will investigate if FSA lending terms – loan amount, interest rate, or loan maturity period – vary to borrowers, based on their double minority status such as Black or African American female borrowers, Hispanic or Latino female borrowers, American Indian female borrowers, or Asian female borrowers, compared to White female borrowers.

CHAPTER 3

METHOD

3. Data and Variable Descriptions

3.1 Data

This study utilizes the USDA FSA national dataset of FSA's lending under its direct loan program, collected between 2004 and 2014 (USDA FSA, 2018). The USDA FSA national dataset compiles borrower's financial performance measures (operating expense ratio, current ratio, and debt-asset ratio), structural and demographic attributes (e.g., age, race/ethnicity, gender, marital status, gross revenue, and farm size), loan attributes (beginning farmer program, operating loan program, and refinancing loan program) and approved loan terms of the FSA's existing direct borrowers (loan amount, interest rate, and loan maturity) between 2004 and 2014, operating as single proprietorship businesses. The choice of single proprietorship is justified as the sole owner of the business is the borrower of the farm loan or the representative of the farm under study (Escalante et al., 2017).

3.2 Variable Description

This study uses three indicators representing the lending terms or the primary components of a loan package for approved borrowing applications. These indicators – interest rate, loan amount,

and loan maturity – will be used to investigate if the FSA lending terms vary to borrowers, based on their double minority status. Hence, these lending terms or loan packaging terms will serve as the dependent variables. The explanatory variables are categorized into three major groups: financial performance measures, structural and demographic variables, and loan attributes.

a. Financial performance measures: Following the approach used by a previous study **(**Escalante et al., 2017), the financial performance measures considered in this study include the following:

Term debt coverage ratio: Term debt coverage ratio also known as debt servicing coverage ratio, measures the borrowers' credit risk profile, such as repayment capacity. In corporate finance, it is used as a measure of a borrower's ability to cover his/her total annual debt services, which includes interest rate and the current portion of long-term debt obligations paid (Escalante et al., 2017). Term debt coverage ratio is calculated as:

$$Term\ debt\ coverage\ ratio = \frac{Operating\ income}{Total\ debt\ service}$$

Operating expense ratio: Operating expense ratio, which measures financial efficiency of the borrower, is a measure of what it costs to operate a farm relative to the income that the operation of farm generates. Operating expense ratio is calculated as:

$$Operating\ expense\ ratio = \frac{Total\ operating\ expenses - \frac{Depreciation}{Ammortization}}{Gross\ income}$$

Current ratio: Current ratio is a liquidity ratio that measures farm's ability to pay short-term obligations. A farm with current ratio less than one does not have capital on hand to meet its short-term obligations if they were all due at once, while a current ratio greater than 1 indicates the farm should be able to remain solvent in the short-term. However, the current ratio at any one

time merely provides a snap-shot of the firm's liquidity conditions. It is usually not a complete representation of a farm's liquidity or solvency, which could accurately be captured by cash flow projections and related measures. Current ratio is calculated as:

$$Current\ ratio = \frac{Total\ current\ farm\ assets}{Total\ current\ farm\ liabilities}$$

Current ratio is a relative term rather than absolute dollar amount and anything between 1.5: 1 and 2:1 or higher is preferred by lenders (Investopedia, 2019). It measures the liquidity condition of the borrowers.

Debt-asset ratio: Debt-asset ratio, also known as debt ratio, is the leverage ratio that indicates the percentage of assets that is being financed with debt. The higher the ratio, the greater the degree of leverage and financial risk. The debt-asset ratio is commonly used by creditors to determine the amount of debt, the ability to repay its debt, and whether additional loan will be extended to the farm. Hence, debt-asset ratio measures leverage conditions of the borrower.

It is calculated as:

$$Debt\ asset\ ratio\ = \frac{Total\ \ liabilities}{Total\ assets}$$

b. Loan attributes: The loan attribute variables will capture the specific characteristics of FSA's direct credit accommodations. Following Escalante et al. (2017), this study uses three variables to capture loan attributes of borrowed loans.

Beginning farmer dummy: The beginning farmer dummy variable equals 1 if the FSA classifies the loan as beginning farmer program, and zero otherwise. According to USDA-FSA (2018), beginning farmers are those who operate farm or ranch for less than 10 years.

Operating loan dummy: The operating loan dummy variable equals 1 if the loan is approved for funds used for the short-term operating needs of the farm operation, and zero otherwise.

Refinancing loan dummy: The refinancing loan dummy variable equals 1 if the loan is for refinancing purpose, and zero otherwise.

c. Structural and demographic attributes: The structural and demographic attributes include:

Age: Age, representing age of the borrower, is a continuous variable (measured in years) to distinguish younger farm borrowers from older borrowers.

Gross revenue: Gross revenue measures farm's annual gross revenue and the USDA Economic Research Service has used it as a size measure.

Marital status dummy: The marital status dummy represents marital status of the farm loan borrower. It equals 1 if the loan borrower is married, and zero otherwise.

Female dummy: The female dummy variable is a gender identifier corresponding to the official borrower of the FSA loan. The female variable equals 1 if the borrower is female, and zero otherwise.

Married female dummy: The married female dummy variable indicates if the female borrower is married. It equals 1 if female borrower is married, and zero otherwise.

Race/ethnicity dummies: Based on race/ethnicity information, a number of dummy variables are created for each race/ethnicity category. The White dummy variable equals 1 if the borrower is White, and zero otherwise. Likewise, the Black or African American dummy variable equals 1 if the borrower is Black or African American, and zero otherwise. The Asian/Pacific Islander dummy variable equals 1 if the borrower is Asian/Pacific Islander, and zero otherwise. The American Indian dummy variable equals 1 if the borrower is American Indian, and zero otherwise. Finally, the Hispanic or Latino dummy variable equals 1 if the borrower is Hispanic or Latino, and zero otherwise.

Based on gender dummy and race/ethnicity dummy variables, a number of dummy variables are created to represent double minority groups, the variables of interest of this study. The White female dummy variable equals 1 if the borrower is White and female, and zero otherwise. The Black or African American female dummy variable equals 1 if the borrower is Black or African American and female, and zero otherwise. Likewise, the Asian female dummy variable equals 1 if the borrower is Asian and female, and zero otherwise. The American Indian female dummy variable equals 1 if the borrower is American Indian and female, and zero otherwise. Finally, the Hispanic or Latino female dummy variable equals 1 if the borrower is Hispanic or Latino and female, and zero otherwise.

3.3 Methodology

This study's analytical framework consists of two approaches. The first approach employs econometric analytical techniques to analyze the determinants of each of the three lending or loan packaging terms (loan amount, interest rate, and maturity). A system of equations model is developed to analyze these three variables of interest. The second approach involves a simulation

analysis for each of several subgroupings of borrowers with specific race and gender attributes. This analysis is designed to determine the effect of combinations of pricing and term (maturity) decisions made by lenders on the borrowing group's resulting profitability and net cash positions.

3.3.1 Econometric Analysis

The general approach of the Ordinary Least Square (OLS) models requires that there is only one dependent variable in each regression equation, i.e.

$$Y_{ij} = \boldsymbol{X}_{ij}\boldsymbol{\beta}_j + \boldsymbol{e}_{ij} \qquad (3.1)$$

where, Y_{ij} is the dependent variable, $\boldsymbol{X}_{ij}$ is a k_i-vector of the explanatory variables for observational unit i, $\boldsymbol{\beta}$ is regression coefficients of the standardized variables to be estimated, and $\boldsymbol{e}_{ij}$ is an unobservable error terms assumed to be normally distributed. The OLS estimator assumes that all coefficients in the model are unknown and are estimated from the given data by

$$\beta_i^{OLS} = (X_i' X_i)^{-1} X'^{Y_i} \qquad (3.2)$$

If the parameters of each equation are estimated separately by the OLS, a potential correlation between the equations is not taken into account. In other words, it is implicitly assumed that the error terms are not contemporaneously correlated, i.e.

$$E\,(\varepsilon_{ij,}\varepsilon_{i'k}) = 0 \text{ if } i \neq i' \qquad (3.3)$$

Zellner (1962) developed Seemingly Unrelated Regression (SUR) estimator that accounts for those contemporaneous correlations and allows *p* dependent variables to have different sets

of explanatory variables. This means that each equation can be regressed separately using OLS, but the error terms can be correlated across the equations, i.e.

$$E\,(\varepsilon_{ij,}\varepsilon_{i'k}) \neq 0 \qquad (3.4)$$

Although the system of equations in SUR model can be estimated using OLS, the results are not efficient. The SUR method estimates the parameters of all equation concurrently, so that the parameters of each single equation also take information provided by another equations into account. The motivation for using SUR method instead of OLS is that SUR is used with multiple equations when error term across the equations being correlated. This is a preferred technique as far as efficiency goes and even if the error terms are uncorrelated, SUR estimators would be identical to OLS estimators (Greene, 2012).

This analysis uses the following SUR formulation (Moon and Perron, 2006).

$$y_{11} = \beta_1^{'} x_{11} + u_{11}$$

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$$y_{ij} = \beta_j^{'} x_{ij} + u_{ij} \qquad (3.5)$$

where, y_{ij} is dependent variable, x_{ij} is a k_i-vector of explanatory variables for observational unit i, β is regression coefficients of the standardized variables to be estimated, and u_{ij} is an unobservable error term. This equation can be expressed equivalently as follows (Greene, 2012):

$$Y_{ij} = X_{ij}\beta_j + e_{ij}, i = 1, \ldots\ldots, N; j = 1, \ldots\ldots, M \qquad (3.6)$$

The SUR estimators that accounts for interrelations between the single sub-model can be obtain as:

$$\beta^{SUR} = [X'\ \Omega^{-1}\mathrm{X}]^{-1}\ [X'\Omega^{-1}Y] \qquad (3.7)$$

where, Ω^{-1} is a weighting matrix based on the covariance matrix of the error terms.

The SUR technique also allows nonzero covariance between error terms e_{ij} and e_{ik} for a given individual i across equations j and k:

$$cov(e_{ij}, e_{ik}) = \sigma_{ij},$$

$$cov(e_{ij}, e_{i'k}) = 0 \text{ if } i \neq i'. \qquad (3.8)$$

This shows that SUR model is an application of the generalized least squares (GLS) approach that consists of several regression equations, each having its own dependent variable and a set of exogenous explanatory variables and the unknown residual covariance is estimated from the data. The equations are called seemingly unrelated because they are only related through error terms (Greene, 2012).

Table 3.1: Descriptions of the variables

Dependent variables	
Loan amount	Loan amount borrowed, in thousand US dollar
Interest rate	Interest rate charged to borrower, in percentage
Loan maturity	Number of years the borrower is expected to repay the loan
Explanatory variables	
Financial performance measures (FINPER)	
Term debt coverage ratio	Ratio between operating income and total debt service

Operating expense ratio	Difference between total operating expenses and depreciation/amortization divided by gross farm income
Current ratio	Ratio between total current farm assets to total current farm liabilities
Debt-assets ratio	Difference between total debt and total liabilities divided by total assets
Structural and demographic attributes (DEMO)	
Female dummy	Dummy variable that equals 1 if the borrower is female, and 0 otherwise
Black or African American dummy	Dummy variable that equals 1 if the borrower is Black or African-American, and 0 otherwise
Asian dummy	Dummy variable that equals 1 if the borrower is Asian American, and 0 otherwise
American Indian dummy	Dummy variable that equals 1 if the borrower is American-Indian, and 0 otherwise
Hispanic dummy	Dummy variable that equals 1 if the borrower is Hispanic or Latino, and 0 otherwise
Age	Age of the borrower in years
Married dummy	Dummy variable that equals 1 if the borrower is married, and 0 otherwise
Married female dummy	Dummy variable that equals 1 if the borrower is married female
Gross revenue	Gross revenue of the borrower from farm and non-farm income sources in US dollar
Loan attribute (LOANCHAR)	
Beginning farmer dummy	Dummy variable that equals 1 if the borrower is beginning farmer, and 0 otherwise
Operating loan dummy	Dummy variable that equals 1 if the loan is borrowed under Operating Loan Program, and 0 otherwise
Refinancing loan dummy	Dummy variable that equals 1 if the loan is for refinancing purpose, and 0 otherwise

We model the FSA loan terms (loan amount, interest rate, or loan maturity) to depend on borrower's financial performance measures (term debt coverage ratio, operating expense ratio, current ratio, and debt-asset ratio), loan attributes (beginning farmer program, operating loan program, and refinancing loan program), and structural and demographic attributes (age, gender, marital status, race/ethnicity, income, and gross revenues). Since the borrower's approved loan terms (loan amount, interest rate, or loan maturity) are concurrently determined, the SUR estimators lead to efficient parameter estimates to identify any significantly different patterns in

the FSA's loan terms (loan amount, interest rate, or loan maturity), based on demographic profile of borrowers (Yaha et al., 2008).

Our model for FSA lending term biases to minority group consists of three single equations to simultaneously predict the borrowers approved loan amount, interest rate, and loan maturity. The three separate equations in the models are as follows:

$$Loan\ amount_{i1} = \beta_1' FINPER_{i1} + \beta_2' DEMO_{i1} + \beta_3' LOANCHAR_{i1} + e_{i1}, \qquad (3.9)$$

$$Interest\ rate_{i2} = \beta_1' FINPER_{i2} + \beta_2' DEMO_{i2} + \beta_3' LOANCHAR_{i2} + e_{i2}, \qquad (3.10)$$

$$Loan\ maturity_{i3} = \beta_1' FINPER_{i3} + \beta_2' DEMO_{i3} + \beta_3' LOANCHAR_{i3} + e_{i3}, \qquad (3.11)$$

where, loan amount, interest rate, and loan maturity are dependent variables and FINPER, DEMO, and LOANCHAR are explanatory variables, and Table 3.1 reports a brief description of the variables used in the analysis.

3.3.2. Simulation Analysis

Using FSA direct borrowers' data, this analysis simulates how combinations of interest rate and maturity levels prescribed by lending officers to specific borrower group belonging to different racial or ethnic labels, affect the resulting profitability (net farm income) and net cash position after debt servicing using @Risk. @Risk is an add-in tool for Microsoft Excel that performs risk analysis on any spreadsheet model by using a Monte Carlo simulation (Palisade, 2019). Assuming interest rate and loan maturity are normally distributed, we run simulation (total simulations = 5000) for several ethnic and gender groups (White males, White females, African American females, Hispanic or Latino females, Nonwhite males, Nonwhite Females, where

Nonwhite combines all ethnic minority groups) to determine the resulting profitability (net farm income) and net cash after debt servicing. Table 3.2 summarizes the input-output variables for @RISK simulations.

Table 3.2: Input-output matrix in @RISK simulations

Input-output variables	Descriptions
Gross revenue	Known input
Operating expenses	Known input
Total non-farm income	Known input
Total family living expenses	Known input
Total non-farm expenses	Known input
Interest rate	Uncertain input
Loan maturity	Uncertain input
Loan amount	Decision variable
Net farm income	Output
Net cash after debt servicing	Output

The input-output matrix consists of variables associated with four categories: known input (inputs are any known numbers that you start with and lead to outputs of interest), uncertain input (they are uncertain and require probability distribution; actually, these probability distribution usually require parameters, such as mean and standard deviation of a normal distribution), decision variable (values that can be changed to make certain outputs move in desired direction), and output. The variables gross revenue, operating expenses, total non-farm income, total family living expense and total non-farm expenses are “known input,” interest rate and loan maturity are “uncertain input,” loan amount is “decision variable”, and net farm income and net cash after debt servicing are “output.” The relationship between output variables and input variables are as follow:

$$Net\ farm\ income = Gross\ revenue - operating\ expenses - (Interest\ rate \times Loan\ amount) \quad (3.12)$$

$$Net\ cash\ after\ debt\ servicing = Inflows - Outflows - Debt\ servicing \quad (3.13)$$

where,

$$Inflows = Gross\ revenues + Total\ nonfarm\ income \quad (3.14)$$

$$Outflows = Operating\ expenses + Total\ family\ living\ expenses + Total\ nonfarm\ expenses \quad (3.15)$$

Debt servicing values will be derived using the following present value formula for a uniform payment series (i.e. equal amortizations of principal and interest for each year given interest rate, loan amount, and maturity).

$$Debt\ servicing = Loan\ amount \left(\frac{Interest\ rate}{1-(1+Interest\ rate)^{-Maturity}}\right) \quad (3.16)$$

CHAPTER 4

FINDINGS

4.1. Descriptive Summary Statistics

The FSA direct lending dataset used in this study consists of 108,565 loan observations provided by the FSA from 2004 to 2014. However, after excluding covariates with missing values and outliers, a total of 27,607 observations are used for this analysis. Table 4.1 reports summary statistics of the variables used in this study.

Table 4.1: Summary statistics

Variables	Mean	Std. Dev.
Dependent variable		
Loan amount ($ '000)	103.07	87.00
Interest rate (%)	2.94	1.46
Loan maturity (year)	17.49	13.34
Explanatory variables		
Financial performance variables (FINPER)		
Term debt coverage ratio	2.15	17.54
Operating expense ratio (%)	80.69	424.67
Current ratio	4.98	317.92
Debt-assets ratio	85.93	1322.32
Structural and demographic attributes (DEMO)		
Age (year)	38.87	13.40
Married dummy	0.62	0.48
Female dummy	0.10	0.30
Married female dummy	0.06	0.25
White dummy	0.92	0.25
Black or African American dummy	0.02	0.13
American Indian dummy	0.04	0.20

Hispanic or Latino dummy	0.01	0.05
Asian dummy	0.01	0.08
Gross revenue ($ '000)	185.83	285.47
Loan attribute (LOANCHAR)		
Beginning farmer	0.62	0.49
Operating loan	0.60	0.49
Refinancing loan	0.12	0.33

Average borrowers had nearly $104 thousand of obligated loan amount, were charged 2.94 percent of interest rate, and had 17.50 years of loan maturity period. The financial performance variables reported in the table indicate that term debt coverage ratio was 2.15 implying that net operating income covers debt services 2.15 times, operating expense ratio for average borrower was nearly 81 percent meaning that more than 80 percent of the gross revenue was spent to operate the farm business versus the income it generates, current ratio was nearly 5 indicating that the farm's current assets is enough to covers it's current liabilities five times, and debt-asset ratio was nearly 85.93. In the structural and demographic variables, 10 percent of the borrowers were female, sixty-two percent of them were married, and 6 percent of them were married female. Regarding race/ethnicity, 92 percent of the borrowers were White, 4 percent of the borrowers were American Indian, 2 percent of the borrowers were Black or African American, and one percent of the borrowers were Hispanic or Latino and Asian each. The borrowers on average, were 39 years old. Regarding loan attribute variables, average borrowers had $186 thousand gross revenue, which according to USDA-ERS farm size classification, falls into large scale family farm. Similarly, 62 percent of the total borrowers were beginning farmers. Of the total direct loan disbursed by FSA, 60 percent was operating loans and 12 percent was refinancing loan**.**

4.2. Comparing FSA Lending Terms between Male and Female

Table 4.2 compares the FSA lending terms - loan amount, interest rate, and loan maturity between male and female.

Table 4.2: Comparing FSA lending terms between male and female

FSA lending terms	Male	Female
Obligated amount ($1000)	105.17	84.67*
Interest rate (%)	2.92	3.02*
Loan maturity period (year)	17.58	16.71*

Note: * denotes that the difference in FSA lending term (obligated amount, interest rate, or loan maturity period) is statistically significant between female and male (reference group), at five percent level or better.

The obligated loan amount for male borrowers was $105.17 thousand compared to $84.67 thousand for female borrowers. In contrast, interest rate charged for female borrowers was 3.02 percent compared to 2.92 percent for male borrowers. However, loan maturity period for male borrowers was longer than for female borrowers (17.58 years for male borrowers compared to 16.71 years for female borrowers). As we see in the table, the difference in the FSA lending terms between male and female are also statistically significant. Hence, our findings support previous findings that FSA lending terms favor male borrowers, compared to female borrowers (Escalante et al., 2009).

4.3 Comparing FSA Lending Terms between White Females and Double Minority Groups

Table 4.3 compares FSA lending terms between White female borrowers and female borrowers in various racial/ethnic groups – Black or African American females, American Indian females, Asian females, and Hispanic or Latino females. The obligated loan amount for Black or African American female borrowers ($53.35 thousand) and Asian females ($60.07 thousand) were lower

than White female borrowers ($85.01 thousand), American Indian female borrowers ($ 92.96 thousand), or Hispanic or Latino female borrowers (US $ 92.09 thousand). However, interest rates charged for Black or African American female borrowers (3.47 percent) and Hispanic or Latino female borrowers (3.14 percent) were higher than White female borrowers (3.01 percent), American Indian borrowers (3.05 percent), or Asian female borrowers (2.95 percent). In terms of loan maturity period, Black or African American female borrowers (14.91 years) and Asian female borrowers (14.94 years) had short loan maturity periods, compared to White female borrowers (16.62 years), American Indian female borrowers (19.13 years), and Hispanic or Latino female borrowers (15.09 years).

Table 4.3: Comparing FSA lending terms among female with different race/ethnicity

FSA lending terms	White female	Black or African American female	American Indian female	Asian female	Hispanic or Latino female
Obligated loan ('000)	85.01	53.35*	92.96	60.07*	92.09
Interest rate (%)	3.01	3.47*	3.05	2.95	3.14
Loan maturity (year)	16. 62	14.91	19.13*	14.94	15.09

Note: * denotes that the difference in FSA lending term (obligated amount, interest rate, loan maturity period) is statistically significant between female belonging to various ethnic group and White female (reference group), as indicated by column headings, at five percent level or better.

The descriptive analyses in Tables 4.2 and 4.3 show that FSA lending terms prescribed for minority and double minority groups seem to be less favorable than those enjoyed by other borrowers. We use advanced econometric technique (Seemingly Unrelated Regressions) to further investigate this issue.

4.4 Determinants of FSA Lending Terms: SUR Results

Since the objective of this study is to investigate if the FSA lending terms differentiate borrowers, based on their double minority groups, we first analyze the determinants of FSA lending terms using SUR model and Table 4.4 summarizes the SUR results (regression coefficients) performed for obligated loan, interest rate, and loan maturity by estimating equations (3.9), (3.10), and (3.11). This initial SUR model run uses basic singular racial and gender labels before introducing the double minority labels.

The regression equations are statistically significant, as indicated by chi-squared statistics and corresponding *p*-values, to explain the variations in FSA lending terms (loan amount, interest rate, and maturity period). As indicated by R-square, 47 percent of the variations in obligated loan amount, 28 percent of the variations in interest rate, and 35 percent of the variations in loan maturity period are explained by the regression equations. The decision criterion for the hypothesis testing is based on 10 percent level of significance (Greene, 2012).

Table 4.4: Determinants of FSA lending terms

VARIABLES	Ln(obligated loan, '000)	Interest rate (%)	Loan maturity (year)
	(1)	(2)	(3)
Structural and demographic attributes			
Ln(age)	0.2534***	0.4875***	2.4363***
	(0.0190)	(0.0285)	(0.2491)
Married dummy	0.02879**	-0.0537***	0.4872***
	(0.0117)	(0.0177)	(0.1543)
Female dummy	-0.08403***	0.1943***	-0.2174
	(0.0273)	(0.0409)	(0.3573)
Married female dummy	0.1119***	-0.2260***	0.1821
	(0.0340)	(0.0511)	(0.4456)
Black or African American dummy	-0.1040***	0.1591***	-0.1551
	(0.0389)	(0.0585)	(0.5101)

Asian dummy	-0.2809***	-0.1200	-2.7134***
	(0.0622)	(0.0934)	(0.814)
American Indian dummy	0.1335***	0.1901***	1.9541***
	(0.0250)	(0.0376)	(0.3281)
Hispanic or Latino dummy	-0.0523	0.6564***	2.1751*
	(0.0966)	(0.1450)	(1.264)
Ln(gross revenue)	0.3103***	9.237e-04	0.2287***
	(0.0036)	(0.0055)	(0.0483)
Financial performance measures			
Operating expense ratio	2.540e-05**	2.704e-05	3.243e-04**
	(1.173e-05)	(1.761e-05)	(1.535e-04)
Debt-assets ratio	-3.135e-06	-2.865e-08	-1.513e-05
	(3.751e-06)	(5.630e-06)	(4.909e-05)
Current ratio	-6.338e-06	-2.508e-05	-1.790e-05
	(1.560e-05)	(2.341e-05)	(2.041e-04)
Term debt coverage ratio	-4.685e-04*	-1.468e-04	-0.009370**
	(2.827e-04)	(4.243e-04)	(0.003699)
Loan attributes			
Beginning farmer dummy	0.3605***	-0.2310***	0.2948*
	(0.012)	(0.01814)	(0.1581)
Operating loan dummy	-1.1423***	-0.8421***	-15.294***
	(0.0105)	(0.01576)	(0.1374)
Refinancing loan dummy	0.3987***	-0.2391***	-2.7120***
	(0.0165)	(0.02482)	(0.2164)
Constant	-0.0899	2.9475***	18.183***
	(0.1082)	(0.1625)	(1.4165)
Year fixed effects	Included	Included	Included
R^2	0.471	0.281	0.347
X^2	24587.34	10804.83	14688.93
P-values	0.00	0.00	0.00
Observations	27,606	27,606	27,606

Note: SUR coefficients; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

In column (1), the dependent variable is obligated amount and the variable is used in its log form to minimize the variations. The variables ln(age), married dummy, American Indian dummy, ln(gross revenue), operating expense ratio, beginning farmer dummy, and refinance loan dummy were all positive and significant to explain obligated loan amount (*ln(obligated loan))* at 5 percent level or better. But the variables Black or African American dummy, Asian dummy,

and operating loan dummy were all negative and significant at 5 percent level or better to explain obligated loan amount. Married borrowers had 4 percent larger obligated loan amount, compared to single borrowers. In contrast, Black or African American borrowers had 10 percent less obligated loan amount and Asian borrowers had 28 percent less obligated loan amount, compared to White borrowers. One percent increase in gross revenue was associated with 31 percent increase in obligated loan amount. Female dummy or Hispanic or Latino dummy do not have a significant influence on the dependent variables. Regarding loan attributes, operating loan borrowers had 114 percent less obligated loan amount, compared to its counterpart (ownership and emergency loans). On the other hand, beginning farmers had 36 percent, and refinancing loan borrowers had 40 percent larger obligated loan amount compared to their respective counterparts. Regarding the financial performance measure, the variable operating expense ratio is positive and significant at a 5 percent level, but the variable term debt coverage ratio is negative and significant to explain the variation in the obligated loan amount, and marginal effects of both terms are very small.

In column (2), the dependent variable is interest rate. Among structural and demographic attributes, the variable ln(age), Black or African American dummy, American Indian dummy, and female dummy were all positive and significant at 5 percent level or better, but the variable married dummy was negative and significant to explain the interest rate charged by FSA to its loan borrowers. Regarding loan attributes, beginning farmer dummy, operating loan dummy, and refinance loan dummy were negative and significant at 5 percent level or better. Married borrowers were charged almost 8 percent lower interest rate, compared to their unmarried counterparts. Black or African American borrowers were charged almost 16 percent higher interest rate and Hispanic or Latino borrowers were charged 66 percent higher interest rates

compared to White borrowers. In loan attributes, beginning farmer were charged 23 percent lower interest rate, operating loan borrowers were charged 84 percent lower interest rate, and refinancing loan borrower were charged 23 percent lower interest rate, compared to the borrowers who were not in the respective borrowing groups.

In column (3), the dependent variable is loan maturity, which represents number of years given to the borrowers to fully repay their loan obligations. Regarding structural and demographic attributes, ln(age), married dummy, and ln(gross revenue) were positive and significant but the variable Asian dummy was negative and significant at one percent level or better to explain loan maturity. In loan attributes, the variable beginning farmer dummy was positive and significant, but the variables operating loan dummy and refinancing loan dummy were negative and significant at 10 percent level or better. Regarding financial performance measures, operating expense ratio was positive and significant, but term debt coverage ratio was negative and significant to explain loan maturity at 5 percent level or better. The coefficient suggests that married borrowers had 0.50 year longer loan maturity period than unmarried borrowers. Asian borrowers were associated with 2.71 years shorter loan maturity period, but American Indian borrowers were associated with 1.95 years longer loan maturity period, compared to White borrowers. A one percent increase in gross revenue was associated with 0.22 years longer loan maturity. If the borrowed loan was for the purpose of farm operation, the loan maturity period was 15.29 years shorter compared to the borrowed loan for other purposes, and if the loan was for the purpose of refinancing loan, loan maturity period was 2.71 years shorter. The loan maturity period was 0.30 years longer for beginning farmers.

We did the Breusch-Pagan test to see if the residuals in the *ln(obligated loan), interest rate,* and *maturity period* equations are correlated. Since Breusch-Pagan test of independence: *chi2(3)* = 4532.079 with *P* = 0.0000, we reject the null hypothesis that the residuals in *ln(obligated loan), interest rate,* and *maturity period* equations have zero correlation (StataCorp, 2013) . Hence, the residuals in the three SUR equations are significantly correlated, which also justifies the use of SUR model to investigate our research question – do FSA lending terms vary to borrowers, based on their double minority labels.

4.5 FSA Lending Terms and Double Minority Groups: SUR Results

Since the goal of this research is to investigate if the FSA lending terms differentiate borrowers, based on their double minority status, we introduced a number of dummy variables representing these double minority groups (Black or African American female dummy, American Indian female dummy, Asian female dummy, and Hispanic or Latino female dummy) in the baseline regression model, reported in Table 4.4. Table 4.5 reports the SUR results with double minority groups as additional covariates.

Table 4.5: FSA lending terms and double minority groups

VARIABLES	Ln(obligated loan, '000)	Interest rate (%)	Loan maturity (year)
	(1)	(2)	(3)
Structural and demographic variables			
Ln(age)	0.2536***	0.4867***	2.4306***
	(0.0190)	(0.0285)	(0.2492)
Married dummy	0.02857**	-0.0539***	0.4873***
	(0.0117)	(0.0177)	(0.1543)
Female dummy	-0.0833***	0.2094***	-0.1388
	(0.0278)	(0.0418)	(0.3645)
Married female dummy	0.1144***	-0.2252***	0.1770
	(0.0340)	(0.0511)	(0.4460)

Black or African American dummy	-0.1211***	0.1600***	-0.1123
	(0.0409)	(0.0614)	(0.5357)
Black or African American female dummy	0.1826	-2.057e-04	-0.4053
	(0.1317)	(0.1977)	(1.7239)
Asian dummy	-0.2377***	-0.07945	-2.7767***
	(0.0709)	(0.1064)	(0.9281)
Asian female dummy	-0.1883	-0.1827	0.2382
	(0.1478)	(0.2218)	(1.9338)
American Indian dummy	0.1444***	0.2157***	2.0983***
	(0.0270)	(0.0406)	(0.3545)
American Indian female dummy	-0.0748	-0.1783*	-1.0003
	(0.0711)	(0.1067)	(0.9307)
Hispanic or Latino dummy	-0.1097	0.7765***	2.7246**
	(0.1048)	(0.1573)	(1.3719)
Hispanic or Latino female dummy	0.3801	-0.8004**	-3.6609
	(0.2701)	(0.4053)	(3.5346)
Ln(Gross revenue)	0.3103***	0.00125	0.2304***
	(0.0036)	(0.00554)	(0.0483)
Financial performance measures			
Operating expense ratio	2.528e-05**	2.661e-05	3.222e-04**
	(1.173e-05)	(1.760e-05)	(1.535e-04)
Debt-assets ratio	-3.137e-06	-9.125e-08	-1.545e-05
	(3.751e-06)	(5.629e-06)	(4.908e-05)
Current ratio	-6.325e-06	-2.506e-05	-1.781e-05
	(1.559e-05)	(2.340e-05)	(2.041e-04)
Loan attributes			
Term debt coverage ratio	-4.688e-04*	-1.438e-04	-0.009357**
	(2.826e-04)	(4.242e-04)	(0.003699)
Beginning farmer dummy	0.3604***	-0.2311***	0.2943*
	(0.0120)	(0.0181)	(0.1581)
Operating loan dummy	-1.1425***	-0.8427***	-15.297***
	(0.0105)	(0.01576)	(0.1374)
Refinancing loan dummy	0.3985***	-0.2387***	-2.7094***
	(0.0165)	(0.02482)	(0.2164)
Constant	-0.0926	2.9433***	18.173***
	(0.1083)	(0.1625)	(1.4170)
Year fixed effects	Included	Included	Included
R^2	0.471	0.281	0.347
X^2	24600.11	10814.82	14692.39
P-values	0.00	0.00	0.00
Observations	27,606	27,606	27,606

Note: SUR coefficient; standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Similar to Table 4.4, Black or African American dummy and Asian dummy were negative and significant but American Indian dummy was positive and significant to explain the dependent variable – ln(obligated loan amount). However, none of the double minority variables – Black or African American female dummy, Asian female dummy, American Indian female dummy, or Hispanic or Latino female dummy – were significant to explain the variations in the obligated loan amount. Other variables – ln(age), married dummy, female dummy, married female dummy, ln(gross revenue), operating expense ratio, total debt coverage ratio, beginning farmer dummy, operating loan dummy, and refinancing loan dummy – were significant and consistent with earlier results reported in Table 4.4 to explain the variations in obligated loan.

Similar to Table 4.4, the coefficient results for the Black or African American dummy, American Indian dummy, and Hispanic or Latino dummy were positive and significant to explain the variations in the interest rates charged by FSA. The American Indian female dummy and Hispanic or Latino female dummy were negative and significant, suggesting that interest rates charged by FSA were significantly lower for American Indian female or Hispanic or Latino females, compared to White females. In terms of magnitude, American Indian females were charged with 18 percent lower interest rate and Hispanic or Latino females were charged with 80 percent lower interest rate, compared to White females. Other variables – ln(age), married dummy, female dummy, married female dummy, beginning farmer dummy, operating loan dummy, and refinancing loan dummy – were all significant and consistent with results in Table 4.4 to explain the variations in the interest rate charged by FSA.

In the loan maturity period equation (column 3), Asian dummy, American Indian dummy, and Hispanic or Latino dummy were all significant per Table 4.4. However, none of the

double minority variables were significant to explain the variations in the loan maturity period of the FSA loans. Other variables – ln(age), married dummy, ln(gross revenue), operating expense ratio, term debt coverage ratio, beginning farmer dummy, operating loan dummy, and refinancing loan dummy – were all significant and consistent with Table 4.4 results to explain the variations in loan maturity period.

4.6 Comparing FSA Lending Terms Between Single and Double Minority Labels

Female borrowers were charged with 19 percent higher rate of interest than male borrowers. Compared to White borrowers, American Indian borrowers were charged with 19 percent higher rate of interest and Hispanic or Latino borrowers were charged with 66 percent higher rate of interest (Table 4.4). However, American Indian female were charged with 18 percent lower rate of interest and Hispanic or Latino female borrowers were charged with 80 percent lower rate of interest rate.

4.7 Simulation Results

A Monte Carlo simulation, using @RISK was conducted to understand if the FSA lending terms favor certain demographic groups against other groups. Table 4.6 summarizes the @RISK simulation results, including mean, minimum, maximum, and the mean values for the 5 and 95 percentiles of net income and net cash after debt servicing for borrowers belonging to different race or ethnic groups including double minorities. Please see Table A.1 for the input variables used in @RISK simulation.

Table 4.6: Financial performance of different race or ethnic groups including double minority groups

Financial performance	Group	Mean	Min	Max	5%	95%

Net income	White male	82180	-1288072	1587488	-507193	668663
Net cash after debt servicing	White male	104835	-37784560	165139200	-520021	685452
Net income	White female	47268	-661817	874171	-285313	375702
Net cash after debt servicing	White female	52553	-11751250	4517902	-308405	417257
Net income	Black or African American female	20615	-286439	321819	-115476	156992
Net cash after debt servicing	Black or African American female	39945	-3419429	40116060	-146893	209056
Net income	Hispanic or Latino female	65880	-649609	902407	-258074	394755
Net cash after debt servicing	Hispanic or Latino female	84213	-7422596	44306660	-272074	431066
Net income	Nonwhite male	44411	-1083454	908704	-338941	431750
Net cash after debt servicing	Nonwhite male	51822	-14104210	3906390	-362677	466730
Net income	Nonwhite female	43679	-967600	1021420	-393214	491803
Net cash after debt servicing	Nonwhite female	53177	-13150150	6031390	-407685	518797

Net income and net cash after debt servicing were substantially higher for White male borrowers ($82,180 and $104,835, respectively), compared to Nonwhite male borrowers (mean values $44,411 and $51,822, respectively) and other demographic groups. Comparing White and Nonwhite female borrowers, net income for White female borrowers was higher ($47,268), but cash after debt servicing for Nonwhite female borrowers was higher ($53,177). Net income and net cash after debt servicing were both higher for Hispanic or Latino female borrowers ($65880 and $84213 respectively), compared to African American female borrowers ($20,615 and $39,945 respectively).

CHAPTER 5

DISCUSSIONS

Using USDA FSA lending data between 2004 and 2014, we investigate if USDA FSA lending terms – obligated loan, interest rate, and loan maturity – differentiate borrowers, based on their demographic profiles, such as minority and double minority labels. We use both simple statistical analyses and advanced econometric analyses to investigate if borrowers were differentiated on USDA FSA lending terms based on their demographic profiles. The results indicate that FSA lending terms packaged for borrowers of specific demographic profiles seem less favorable as noted in previous studies (Escalante et al. 2017, Dhakal et al. 2019). Obligated loan amount was significantly lower for Black or African American borrowers or Asian borrowers, but the obligated loan amount was significantly higher for American Indian borrowers, compared to White borrowers. This could be because of small scale farm businesses associated with Black or African American borrowers, compared to White borrowers. Female borrowers were charged significantly higher interest rates, compared to male counterpart. The higher rate of interest charged to female borrowers could reflect FSA's credit risk management strategy to protect its loans. In other words, FSA provides loan to relatively risky borrowers at higher rate of interest.

Similarly, compared to White borrowers, Black or African American borrowers, American Indian borrowers, and Hispanic or Latino borrowers were charged significantly higher

interest rates. Likewise, compared to White borrowers, Asian borrowers had significantly lower loan maturity period, but Hispanic or Latino borrowers had significantly higher loan maturity period. The regression results also indicate that female borrowers were charged significantly higher rate of interest, compared to male counterpart. The simulation results also indicate that White male borrowers had higher net income or net cash after debt servicing. Accordingly, FSA lending terms result into better financial performance for White male borrowers, compared to other borrowers. As many of these findings were similar to previous studies (Escalante et al. 2017, Dhakal et al. 2019), this study provides further support to their contention that USDA FSA lending terms tend to be differentiated, based on borrowers' demographic profiles or minority labels.

The favorable lending terms (obligated amount, interest rate, or loan maturity) or financial performance (net income or net cash after debt servicing) to the male borrowers or White borrowers in USDA FSA lending could be because of sample bias or over representation of these demographic groups in the USDA FSA lending data. For instance, 90 percent of the USDA FSA loan borrowers were males or 92 percent of the borrowers were Whites (Table 1). Further, White borrowers or male borrowers, in general, dominate their Nonwhite borrowers or female borrowers in terms of their profitability, financial efficiency, and liquidity positions, in addition to their much larger scale and size of farm operations (Wu et al., 2011). Hence, it is not surprising that FSA lending terms seem to be more favorable to male borrowers or White borrowers, compared to minority groups.

In contrast, American Indian borrowers had significantly higher amount of obligated loan, interest rate, and loan maturity period. Hispanic or Latino borrowers had longer loan

maturity period and also were charged with higher interest rate. As poverty rates for American Indian farmers or Hispanic or Latino farmers who live in nonmetro are higher (31 percent and 25 percent, respectively), compared to White farmers who live in nonmetro (14 percent) (USDA, ERS, 2019), many farmers belonging to minority groups tend to be unqualified from FSA loan because of FSA's prejudiced lending practices, reported by many previous studies (Escalante et al., 2017; Chandra et al., 2019). However, those who were qualified for FSA loan tend to enjoy with relatively higher obligated loan amount or loan maturity period. FSA charged higher interest rates to these minority groups potentially because of their minority labels, or perceived inferior credit worthiness.

Simple statistical analyses (Table 4.3) reveal some patterns of less favorable lending terms packaged for double minority groups. For instance, obligated loan amounts were lower for Black or African American female borrowers or Asian female borrowers, compared to White female borrowers, American Indian female borrowers, or Hispanic or Latino female borrowers. Interest rates were higher for Black or African American female borrowers, American Indian female borrowers, or Hispanic or Latino female borrowers, compared to Asian female borrowers or White female borrowers. Likewise, Black or African American female borrowers, Asian female borrowers, or Hispanic female borrowers had relatively shorter loan maturity periods, compared to White female borrowers or American Indian female borrowers. The SUR analysis also reveals some evidence that less favorable FSA lending terms were approved for certain double minority groups while other cases proved otherwise (Table 4.5). For instance, interest rates were significantly lower for American Indian female borrowers (18 percent lower) or Hispanic or Latino female borrowers (80 percent lower), compared to White female borrowers (Table 4.5) although interest rates were, in general, higher for female borrowers (6 percent

higher than male borrowers), American Indian borrowers (19 percent higher than White borrowers), or Hispanic or Latino borrowers (66 percent higher than White borrowers) (Table 4.4). Hence, double minority labels result in opposite and much larger coefficient effects. Lower interest rates to American Indian borrowers or Hispanic or Latino borrowers could be because of potential selection bias in FSA lending – many potential borrowers tend to be excluded from FSA loan programs because many of them may be unaware or do not know the procedure to get FSA loans. Hence, FSA lending programs tend to cover only individuals having better financial performance or credit worthiness whom lenders such as FSA charge lower rate of interest. However, the SUR analysis does not find enough evidence that FSA lending terms differentiate double minority groups in obligated loan amount or loan maturity period.

The simulation results reveal a weak financial performance of Black or African American female borrowers, compared to White female borrowers. This result is not surprising given the fact that White females tend to have better socioeconomic characteristics, compared to Black or African American females. For instance, poverty rate for working-age (18-64 age group) White female was nearly 10 percent, compared to 21 percent for Black or African American females in 2015 (Patrick, 2016). However, the financial performances for Hispanic or Latino female borrowers were stronger compared to White female borrowers, despite relatively higher poverty rates for Hispanic or Latino females in the United States (nearly 19 percent) (Patrick, 2016). This could be because very small fraction of Hispanic or Latino females (nearly 1 percent) are farmer in the United States (Monge-Naranjo and Vizcaino, 2018) and those who are in the farm sector could have relatively better socioeconomic characteristics, compared to female borrowers belonging to other race or ethnic groups. Further, because of discriminatory lending practices,

many poor Hispanic or Latino female borrowers tend to be excluded in FSA lending, and accordingly in the FSA lending dataset.

Since minority groups and, in some cases, double minority groups were usually recipients of less favorable lending terms, and in some cases, these loan packaging decisions of lenders could be attributed to their financial wellbeing, or credit worthiness, it is important that FSA makes efforts to find ways to eliminating or minimize these types of decisions. Some of these minority or double minority groups tend to be younger, or unmarried, limiting their credit worthiness. In this regard, FSA should treat minority or double minority groups differently than their counterparts in its lending terms determinations. Also, since heterogeneity in sociodemographic characteristics may exist among borrowers belonging to minority or double minority groups, a holistic approach may not be helpful to mitigate the FSA lending terms biases. It is, thus, important that FSA evaluate each loan application case differently. Previous lawsuits (e.g., Pigford v. Glickmann, Keepseagle v. Vilsack, and Love V. Vilsack) indicate that FSA lending officers discriminated minority groups in their lending decisions and USDA spent huge amount of money to settle down these lawsuits (Farm Progress 2011). In this regard, training to FSA loan officers on the mission of USDA FSA may also help achieve the overall goal of FSA to reach-out to small and marginalized farmers to satisfy their credit needs, but not served by traditional banking.

Although female borrowers had significantly lower loan amount and were charged with significantly higher rate of interest, married female borrowers had significantly higher obligated loan and were charged with significantly lower rate of interest because of potentially better credit worthiness of married female borrowers. We also found that obligated loan amount and loan

maturity period were significantly higher for older borrowers. This could be because of relatively better credit worthiness or financial performance indicators of relatively older borrowers. However, relatively older borrowers were charged with higher interest rate despite their potentially better creditworthiness or financial performance. Per expectation, borrowers with higher gross revenue had significantly higher obligated loan amount or loan maturity period because of their better credit worthiness. Regarding financial performance variables, borrowers with higher operating expense ratio had significantly higher obligated loan amount or loan maturity period. In contrast, borrowers with higher term debt coverage ratio had significantly lower obligated loan amount or loan maturity period because of potentially weak financial performance of the borrowers.

Regarding loan attributes, beginning farmers had enjoyed significantly higher loan amount or loan maturity period, but they were also enjoyed with significantly lower interest rate. This finding is not surprising, given that FSA lending aims to increase credit supplies to beginning farmers (USDA FSA, 2019). Hence, our findings support that FSA lending terms favor beginning farmers. However, borrowers who used FSA loan for farm operations had significantly lower obligated loan amount, interest rate, or loan maturity period. Although interest rate to operating loan was significantly lower, suggesting FSA's lending policies tend to discourage operating loan programs. Since refinancing loan dummy was positively significantly to explain obligated loan amount and negatively significant to explain interest rate, it seems FSA's lending policies support refinancing loan. However, refinancing loan dummy was negatively significant to explain loan maturity period, indicating that borrowers who took refinancing loan had relatively shorter loan maturity period.

CHAPTER 6

SUMMARY AND CONCLUSIONS

The overall goal of this study is to validate whether a traditionally male-dominated industry like farming would produce a more emphatic, resounding evidence of bias against female farmers with racial minority labels than the extent of bias obtained in non-farming industries. The motivation behind this study comes from historical lending discrimination claims of various racial minority borrower groups filed against UDSA in the past (Escalante et al., 2017). Using FSA direct lending data between 2004 and 2014, we find that FSA lending terms – loan amounts, interest rates, and loan maturity periods – tend to be less than ideal as they are packaged for borrowers, based on their demographic profiles. The results indicate that female borrowers, Black or African American borrowers, Asians borrowers, American Indian borrowers, or Hispanic or Latino borrowers were accommodated with less favorable FSA lending terms, compared to their counterparts. For instance, female borrowers or Black or African American borrowers were charged with higher rate of interest, but Black of African American borrowers had lower obligated loan amount, compared to White borrowers. Asian borrowers had lower obligated loan amount and also shorter loan maturity period. Hispanic or Latino borrowers were charged with higher interest rate and they had longer loan maturity period. However, American Indian borrowers were enjoyed with higher obligated loan amount and longer loan maturity period, but they were charged with higher interest rate.

We also found some evidence of FSA's tendency to package less favorable lending terms to double minority groups. For instance, while obligated loan amounts or loan maturity periods were lower for Black or African American female or Asian female borrowers, interest rates were higher for Black or African American female or Hispanic or Latino female borrowers, compared to White female borrowers. However, the regression analyses do not provide enough evidence to support the discriminatory lending practices to double minority groups. The Monto Carlo simulations reveal that the FSA lending terms result into better financial performance (higher net income and net cash after debt servicing) for White male, White female compared other demographic groups.

A couple of caveats of this study should be noted. First, lending terms determined by lenders may also depend on creditworthiness of the borrowers. However, because of the lack of creditworthiness or credit score of borrowers in the dataset, we fail to account for creditworthiness directly in our model. However, we account for all available socioeconomic and demographic factors that are used to predict creditworthiness of borrowers. Second, because of the unavailability of geospatial information of the borrowers, we fail to account for region-specific heterogeneity in the model. Finally, econometric analysis like ours evaluate the strength of the relationship between variables for average individual. The results may not be generalizable to a particular individual.

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APPENDIX

Table A.1: Input variables used in @RISK simulations and summary statistics

Name	Group	Min	Mean	Max	5%	95%
Gross revenue	Hispanic female	-$461,766.50	$149,963.70	$833,797.90	-$133,490.40	$433,077.80
Operating expenses	Hispanic female	-$358,459.10	$81,193.26	$472,906.80	-$89,058.02	$251,173.30
Total non-farm income	Hispanic female	-$144,228.90	$52,623.09	$241,129.00	-$34,155.35	$139,292.20
Total family living expenses	Hispanic female	-$39,761.27	$31,848.80	$107,768.70	$1,531.15	$62,151.67
Total non-farm expenses	Hispanic female	-$33,274.05	$3,785.77	$41,810.29	-$13,390.27	$20,949.11
Inflows	Hispanic female	-$419,754.80	$202,586.80	$879,586.60	-$101,758.30	$497,008.40
Outflows	Hispanic female	-$356,669.90	$116,827.80	$474,175.50	-$54,466.42	$290,377.90
Debt service	Hispanic female	-$44,264,010.00	$1,545.93	$7,597,384.00	-$23,017.97	$37,819.85
Interest rate	Hispanic female	-0.03073976	0.03147706	0.09409517	0.003665695	0.05927724
Maturity (years)	Hispanic female	-36.06139	15.09333	67.00668	-7.862008	38.0305
Loan amount	Hispanic female	-$163,735.10	$92,091.24	$337,874.90	-$13,838.05	$197,938.70
Net income	Hispanic female	-$649,609.20	$65,880.16	$902,407.30	-$258,074.00	$394,754.50
Net cash after debt servicing	Hispanic female	-$7,422,596.00	$84,213.04	$44,306,660.00	-$272,073.90	$431,065.70
Gross revenue	Black female	-$211,573.00	$49,635.25	$340,706.60	-$68,395.22	$167,604.90
Operating expenses	Black female	-$135,210.40	$27,167.74	$197,681.50	-$40,685.69	$94,988.48
Total non-farm income	Black female	-$151,855.90	$47,772.41	$256,044.80	-$44,092.67	$139,487.30
Total family living expenses	Black female	-$80,762.48	$30,957.67	$141,267.00	-$17,095.45	$78,978.63
Total non-farm expenses	Black female	-$21,662.27	$1,243.35	$24,872.38	-$8,577.48	$11,048.55
Inflows	Black female	-$261,447.20	$97,407.66	$419,776.40	-$51,689.24	$245,347.80
Outflows	Black female	-$131,573.30	$59,368.77	$246,003.80	-$22,562.31	$143,573.80

Debt service	Black female	-$40,242,710.00	-$1,905.79	$3,461,450.00	-$11,538.51	$25,118.02
Interest rate	Black female	-0.01444066	0.03474341	0.08008655	0.01399961	0.05547564
Maturity (years)	Black female	-23.9475	14.91525	54.56594	-2.967613	32.77017
Loan amount	Black female	-$154,126.60	$53,363.56	$297,509.00	-$41,778.48	$148,367.50
Net income	Black female	-$286,438.80	$20,614.85	$321,818.70	-$115,476.10	$156,991.60
Net cash after debt servicing	Black female	-$3,419,429.00	$39,944.69	$40,116,060.00	-$146,893.00	$209,056.20
Gross revenue	White female	-$554,191.80	$108,254.10	$733,030.60	-$180,997.60	$397,342.20
Operating expenses	White female	-$333,742.20	$58,462.52	$464,701.80	-$116,295.50	$232,923.30
Total non-farm income	White female	-$148,217.30	$44,258.61	$257,452.00	-$42,329.10	$130,777.50
Total family living expenses	White female	-$47,684.31	$30,012.41	$109,538.60	-$5,182.38	$65,147.87
Total non-farm expenses	White female	-$112,494.10	$3,682.52	$116,435.30	-$45,949.08	$53,270.61
Inflows	White female	-$577,467.80	$152,512.70	$778,831.40	-$152,146.90	$452,993.70
Outflows	White female	-$311,177.00	$92,157.45	$506,479.30	-$94,435.31	$273,416.10
Debt service	White female	-$4,737,344.00	$7,801.88	$11,550,090.00	-$18,336.22	$34,911.08
Interest rate	White female	-0.0224645	0.03011819	0.08283041	0.00588909	0.05431856
Maturity (years)	White female	-32.7413	16.62358	67.66278	-5.043701	38.26159
Loan amount	White female	-$224,308.90	$85,017.60	$380,528.90	-$51,474.45	$221,264.70
Net income	White female	-$661,816.50	$47,267.63	$874,171.20	-$285,312.60	$375,702.40
Net cash after debt servicing	White female	-$11,751,250.00	$52,553.39	$4,517,902.00	-$308,405.20	$417,257.00
Gross revenue	White male	-$898,497.00	$201,117.20	$1,361,411.00	-$289,483.00	$691,257.10
Operating expenses	White male	-$578,906.30	$115,796.90	$825,866.40	-$189,983.60	$421,518.00
Total non-farm income	White male	-$120,993.70	$37,939.68	$194,017.20	-$34,618.76	$110,389.40
Total family living expenses	White male	-$42,521.73	$31,395.39	$113,032.10	-$2,652.45	$65,432.23
Total non-farm expenses	White male	-$94,427.76	$2,976.67	$83,006.62	-$33,939.51	$39,859.45
Inflows	White male	-$976,990.00	$239,056.80	$1,363,031.00	-$257,825.70	$728,276.40
Outflows	White male	-$570,921.60	$150,169.00	$852,500.10	-$162,458.30	$458,030.00

Debt service	White male	-$165,209,000.00	-$15,946.71	$37,769,600.00	-$18,078.13	$40,290.01
Interest rate	White male	-0.02338174	0.02909974	0.08173974	0.005234196	0.05293977
Maturity (years)	White male	-30.54509	17.5693	65.05653	-4.334545	39.44121
Loan amount	White male	-$230,191.60	$106,717.60	$420,750.00	-$37,168.01	$250,369.60
Net income	White male	-$1,288,072.00	$82,179.84	$1,587,488.00	-$507,192.80	$668,663.10
Net cash after debt servicing	White male	-$37,784,560.00	$104,834.60	$165,139,200.00	-$520,021.40	$685,452.30
Gross revenue	Nonwhite male	-$656,028.40	$104,052.30	$818,928.50	-$226,950.70	$434,743.30
Operating expenses	Nonwhite male	-$413,279.00	$57,041.84	$550,777.30	-$137,519.00	$251,325.90
Total non-farm income	Nonwhite male	-$166,867.00	$47,797.58	$242,963.70	-$41,913.94	$137,399.40
Total family living expenses	Nonwhite male	-$50,209.99	$31,014.34	$109,729.70	-$4,888.12	$66,874.87
Total non-farm expenses	Nonwhite male	-$106,182.40	$3,127.59	$110,512.30	-$46,475.73	$52,630.69
Inflows	Nonwhite male	-$608,029.90	$151,849.80	$952,951.90	-$193,488.10	$489,570.80
Outflows	Nonwhite male	-$478,031.00	$91,183.77	$615,638.90	-$111,608.40	$298,645.30
Debt service	Nonwhite male	-$3,550,376.00	$8,844.21	$13,868,180.00	-$17,175.85	$33,199.59
Interest rate	Nonwhite male	-0.02421992	0.03136628	0.09028082	0.006928658	0.05577568
Maturity (years)	Nonwhite male	-32.28446	17.59141	66.73354	-5.21417	40.36789
Loan amount	Nonwhite male	-$209,197.00	$82,654.27	$401,009.60	-$51,146.73	$216,207.30
Net income	Nonwhite male	-$1,083,454.00	$44,410.54	$908,703.50	-$338,940.90	$431,749.50
Net cash after debt servicing	Nonwhite male	-$14,104,210.00	$51,821.87	$3,906,390.00	-$362,676.70	$466,729.80
Gross revenue	Nonwhite female	-$739,023.40	$93,006.13	$859,987.40	-$259,010.50	$444,364.50
Operating expenses	Nonwhite male	-$527,440.30	$46,821.70	$624,358.90	-$218,689.00	$312,005.90
Total non-farm income	Nonwhite male	-$147,012.10	$49,287.79	$242,001.40	-$35,131.38	$133,551.80
Total family living expenses	Nonwhite female	-$55,923.10	$31,325.07	$127,167.80	-$9,172.34	$71,755.10
Total non-farm expenses	Nonwhite male	-$69,694.97	$3,374.59	$77,875.34	-$28,411.98	$35,143.86
Inflows	Nonwhite female	-$690,615.30	$142,293.90	$924,077.40	-$223,864.30	$503,899.10

Outflows	Nonwhite female	-$520,064.50	$81,521.35	$634,922.30	-$184,500.10	$348,409.80
Debt service	Nonwhite female	-$5,548,694.00	$7,595.43	$12,894,230.00	-$17,855.29	$30,215.45
Interest rate	Nonwhite female	-0.02242102	0.03114948	0.07884922	0.009507871	0.05277384
Maturity (years)	Nonwhite female	-36.10501	17.60654	72.17097	-5.074846	40.24665
Loan amount	Nonwhite female	-$228,878.40	$81,165.62	$382,840.60	-$54,977.87	$217,104.60
Net income	Nonwhite male	-$967,600.20	$43,678.61	$1,021,420.00	-$393,214.30	$491,803.10
Net cash after debt servicing	Nonwhite female	-$13,150,150.00	$53,177.15	$6,031,390.00	-$407,684.90	$518,796.50