PROJECTING REGIONAL FINANCIAL STRESS IN AGRICULTURE

UNDER VARIOUS POLICY CONDITIONS

A Dissertation

by

KENNETH RAY ADIX

Submitted to Texas A&M University
in partial fulfillment of the requirements
for the degree of
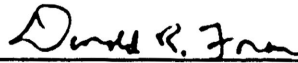
DOCTOR OF PHILOSOPHY

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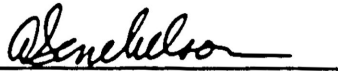
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May 1995

Major Subject: Agricultural Economics

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ABSTRACT

Projecting Regional Financial Stress in Agriculture under Various Policy

Conditions. (May 1995)

Kenneth Ray Adix, B.S., Texas A&M University;

M.B.A., The University of Texas at Austin

Chair of Advisory Committee: Dr. John B. Penson, Jr.

The objective of this study was to measure the relative financial stress on
U.S. farmers resulting from various government policies. U.S. farmers
experienced extreme levels of financial stress during the 1980s due to several
factors. In the early 1970s, U.S. real net cash farm income reached historic levels
and provided the impetus for the record levels of debt acquired by farmers in the
latter stages of the 1970s. This debt was used to expand their operation in the
hope of meeting expected future growth in demand. In the 1980s, however, the
combination of low earnings, record debt, and high interest rates resulted in severe
financial stress for many farmers, high loan losses for agricultural lenders, and
huge government payments to farmers.

A model was developed to explain regional trends in the percent of farm
loan volume delinquent 30 days or more and percent of farmers filing for
bankruptcy. Other indicators of regional financial stress analyzed in this study
were: the times-interest-earned ratio, the debt burden ratio, the financial leverage

index and the debt-to-asset ratio. An existing econometric simulation model of the U.S. economy was used to project aggregate financial statements under four different policy scenarios.

The six measures of financial stress used in this study were projected from 1994 to 2000 under three policy scenarios and compared to a baseline scenario. The baseline assumes that the Conservation Reserve Program (CRP) is eliminated. The other three scenarios being compared to the baseline are: (1) a continuation of CRP, (2) a ten percent reduction in target prices from baseline levels, and (3) a two percent decrease in the growth rate of the money supply from baseline levels.

Overall, the reduction in the money supply was the most financially stressful of all the policy alternatives considered in this study. The Corn Belt and Plains regions suffered the highest levels of financial stress in the U.S., especially when growth in money supply was decreased or when target prices were reduced ten percent. In general, the South region experienced the least financial stress of any region under all policy scenarios. An interesting finding was that farmers actually experienced more financial stress if CRP is continued than if it is eliminated. This mainly occurs because of the increase in deficiency payments occurring when CRP was eliminated.

ACKNOWLEDGEMENTS

First and foremost, I thank God. He brought me back to Texas A&M and gave me the strength and wisdom to complete this task. At times, he was the only one leaving footprints.

Next, I want to express my thanks and love to my wife, Kristin. She is my best friend and has given me much needed love and support over the last four years. I want her to know how proud I am of her for achieving her own goal of becoming a nurse. I want to thank our son, Stephen, for the love and joy he has brought into my life.

I thank my parents for the sacrifices they made in raising me and for the life-long lessons they taught. I will always remember my mother's cooking and my father's shoes hitting the floor while I was still asleep. I will also remember the following sage advice my father gave me when I was trying unsuccessfully to loosen a rusty nut: "You just have to be smarter than the nut".

I want to thank Dr. Penson for his help and guidance while I was here. I also want to thank Dr. Leatham for his willingness to talk with me throughout my time here and give his advice. I thank the other members of my committee: Dr. Fraser, Dr. Goforth and Dr. Ellinger for their advice during the writing of my dissertation. I want to express special thanks to Dr. Oral Capps who went out of his way to help me, even though he was not on my committee. Similar thanks go to Dr. Danny Klinefelter for his help in the early stages of my research.

TABLE OF CONTENTS

CHAPTER   **Page**

LIST OF TABLES

LIST OF FIGURES

FIGURE   Page

CHAPTER I

INTRODUCTION

In the front seat of agriculture's roller-coaster ride over the last 25 years were U.S. farmers, agricultural lending institutions and the U.S. government. Beginning in the early 1970's, farmers saw a rapid increase in net income and expanded their use of debt in the hope of maximizing future profits. Lenders were eager to lend to farmers in order to increase their own market share of agricultural loans. Financial institutions usual concern over loans defaulting was minimized by the rising values in the assets they held as collateral. In the 1980s, however, the combination of low earnings, record debt and high interest rates led to falling net farm incomes and land values. When farmers and lenders experienced rising levels of stress in the mid-1980s, government programs pumped billions of dollars into agriculture.

In retrospect, it is not hard to comprehend the euphoria that existed in the early 1970s. United States real net cash farm income increased over 80 percent in two years (1971-1973). In addition, U.S. agricultural exports increased 174 percent ($13.5 billion) from 1971 to 1974 (USDA-ERS 1994d). Many believed this was just the beginning, that past chronic food surpluses would give way to

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The style and format of this dissertation follow that of the *American Journal of Agricultural Economics*.

chronic shortages. Thus, farmers desire to maximize their growth in net worth (profits and unrealized capital gains) required further borrowing to expand their operations.

The increasing value of the land further fueled investment outlays and helped to secure many new loans. The value of real farm assets grew over 73 percent in the 1970s. Thus, despite debt levels increasing $95 billion (in real terms) in the 1970s, the debt-to-asset ratio actually fell from 18 to 17 percent from 1970 to 1980. This allowed farmers unprecedented borrowing capacity in their pursuit of higher net income, because lenders tended to base lending decisions primarily on collateral value.

Unfortunately, net cash farm income peaked in 1973 in real terms and fell in every subsequent year (except 1978) during the 1970s (Figure 1.1). Despite the fall in earnings, farmers continued to expand their operations, increasing their level of debt every year during the 1970s (Figure 1.2). Farmers nominal aggregate debt reached $167 billion in 1980, an increase of over 240 percent from 1970.

When farmers' debt (in real terms) peaked in 1981, their ability to service this debt was at its lowest point since 1970. Consider two key measures of debt servicing ability: (1) the times-interest-earned ratio and (2) the debt burden ratio. In 1981, the times-interest-earned ratio [TIE = (Net Cash Farm Income + Farm Interest Expense) / Farm Interest Expense] of 2.7 was over 300 percent less than the level of 8.7 in 1973 (Figure 1.3). Also, the debt burden ratio (Farm Debt Outstanding / Net Cash Farm Income) was 300 percent higher in 1981 (5.7) than
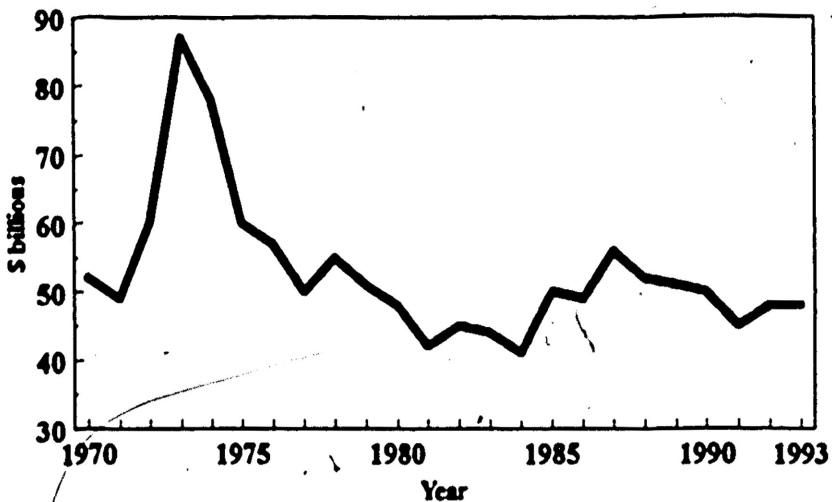
Figure 1.1 U.S. Real Net Cash Farm Income, 1970-93 (USDA-ERS 1994d)
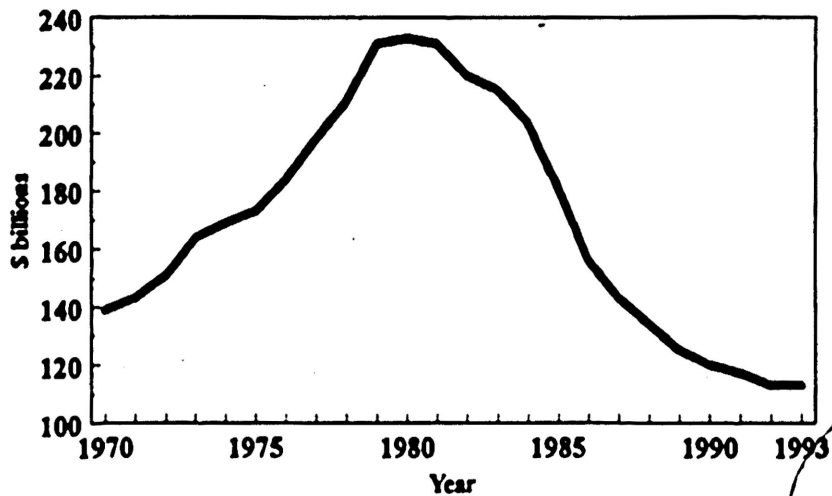
Figure 1.2 U.S. Real Farm Debt Outstanding, 1970-93 (USDA-ERS 1994d)
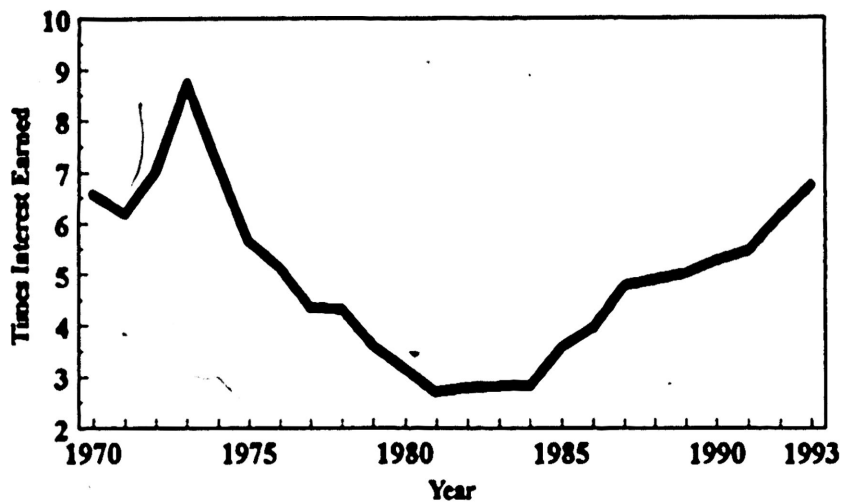
Figure 1.3 U.S. Farmers' Times-Interest-Earned Ratio, 1970-93 (USDA-ERS 1994d)
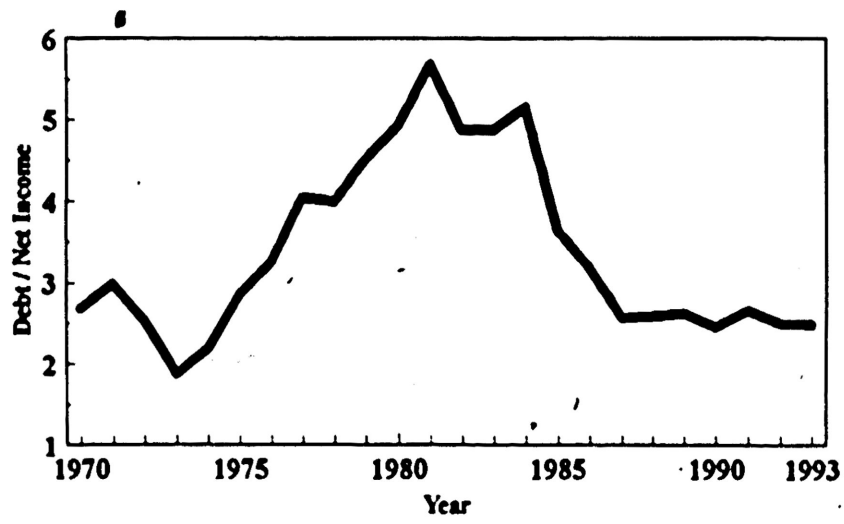
Figure 1.4 U.S. Farmers' Debt Burden Ratio, 1970-93 (USDA-ERS 1994d)

in 1973 (1.9) (Figure 1.4). The prime interest rate was also at a record level of 18.87 percent in 1981. Thus, farmers and lenders sat precariously at the top of the roller-coaster, awaiting the inevitable plummet.

Agriculture's financial deterioration in the early-1980s was reflected in the high loan losses of the largest holder of U.S. real estate farm debt: the Farm Credit System (FCS). FCS loan losses rose from less than $50 million in 1982 to $1.32 billion in 1986. FCS losses over the 1982-1988 period were about $3.8 billion, of which nearly two-thirds were at Federal Land Banks (Sullivan). Commercial banks serving agriculture also experienced severe stress in the 1980s.

Agricultural commercial banks' (defined as those banks whose ratio of farm loans to total loans is greater than 15 percent) nonperforming farm loans rose from $.9 billion in 1982 to $2.6 billion in 1985, when they accounted for 7.3 percent of total farm production loans outstanding at these banks. Net charge-offs (loans that banks write-off as a loss because repayment is unlikely) of non-real estate farm loans at commercial banks peaked at $1.3 billion in 1985. Agricultural bank failures soared in the mid-1980s as loan losses mounted. Whereas only one bank failed in 1981, 66 went broke in 1985, 65 failed in 1986 and 69 failed in 1987 (Sullivan).

One can only imagine how high lender losses would have been if the government farm program safety net had not been there to support farm incomes. At the start of the 1980s, farmers received about $1.8 billion annually from the government in the form of direct government payments. However, by 1985,

payments to farmers were over four times that amount ($7.7 billion). From 1985 to 1989, government payments to agriculture totalled over $61 billion. In 1987, government payments of $16.7 billion accounted for 30 percent of real net cash farm income.

Given the high cost of unforeseen financial stress, it appears that a system that could serve as an early-warning device for financial stress in agriculture would be beneficial. First, such a system could provide policymakers with projections of the relative financial stress associated with various policy alternatives. Agricultural lenders also could use these projections as a basis for (1) adjusting the growth and composition of their portfolios and (2) setting their allowance for loan losses. Finally, farmers, farm input manufacturers and others associated with agriculture would also gain an insight to the potential effects of different government programs on farm financial stress and what this means for input and output sales activity.

Objectives

The main objective of this study is the application of estimated equations and other indicators of financial stress to policy analysis. Indicators of financial stress can be defined in a variety of ways. The percent of farm loan volume delinquent 30 days or more at a financial institution and percent of farmers in the institution's lending area who have filed for bankruptcy are two such indicators.

Others include the times-interest-earned ratio, the debt burden ratio, the

financial leverage index (ROE / ROA), and the debt-to-asset ratio. All of these measures of financial stress will be projected at the regional level for each policy scenario examined in this study. Thus, when evaluating the impact of various government policies, one will be able to examine the trend in a broad set of short-run and long-run measures of financial stress.

Econometric relationships will be estimated using historical information on financial stress and performance for five regions of the country. These relationships will be used as a basis for projecting delinquencies and bankruptcies. Other definitional relationships will be developed to assess the degree of coverage for principal and interest payments in agriculture. Once developed, these equations will be utilized in conjunction with the macroeconomic simulation model named AG-GEM. AG-GEM places specific emphasis on U. S. agriculture and the interface between the macroeconomy and the domestic agricultural sector (Penson and Taylor).

AG-GEM will be used to project the impact various government policies have on agriculture's financial statements as well as the above measures of financial stress. These impacts will then be regionalized using available secondary data. Currently, there is considerable debate over the various government farm programs that will comprise the 1995 Farm Bill. Government is under intense pressure to cut the budget. One of the areas it is looking at is farm programs. One program receiving considerable attention is the Conservation Reserve Program (CRP). CRP was part of the 1985 Farm Bill legislation that paid farmers to idle

highly erodible land for ten years. There are approximately 36 million acres currently in CRP. These acres were originally eligible to come back into production in 1996, ten years after they entered. Due to a roll-back, CRP acres will start coming back into production in 1997.

The ultimate outcome of CRP's future is unknown. Therefore, two separate scenarios concerning CRP will be examined:

- Elimination of the Conservation Reserve Program (CRP). This will be captured in the baseline scenario.

- A 100 percent continuation of the CRP.

A third scenario will examine the affects of reducing target prices by 10 percent from baseline levels. In addition, a fourth (and final) scenario assumes the Federal Reserve slows the growth rate of the monetary base by two percent from baseline levels over the next five years.

It is important to recall that the objective of this study is to project future financial stress under alternative policies. The goal is not to determine the ultimate outcome of a given loan or class of loans. Nor is the objective to forecast that "X percent" of farm loans will be delinquent in a given year.

Instead, the goal is to measure the relative impact that various government policies are likely to have on a broad set of financial stress indicators including the potential change in delinquencies at agricultural banks. For instance, what is the relative impact on financial stress in each region if the Federal Reserve slows the growth rate of the money supply by two percent in each of the next five

years? Thus, the addition of a regional financial stress component to AG-GEM will enhance the capability of AG-GEM to analyze alternative policy scenarios and their affects. This should provide valuable information to farmers, agricultural lenders, farm input manufacturers and policymakers.

Procedures

Data on regional financial stress will be obtained from annual surveys of agricultural banks done by the American Bankers Association (ABA). Sam and Wallace aggregated these ABA survey results into five regions: West, Plains, Northeast, Corn Belt and South (See Figure 1.5). To qualify as an agricultural bank, the institution must have either $2.5 million or more in farm production or real estate loans or have greater than 50 percent of its loan portfolio in farm loans.

Annual farm balance sheet and income statement data will be obtained at the
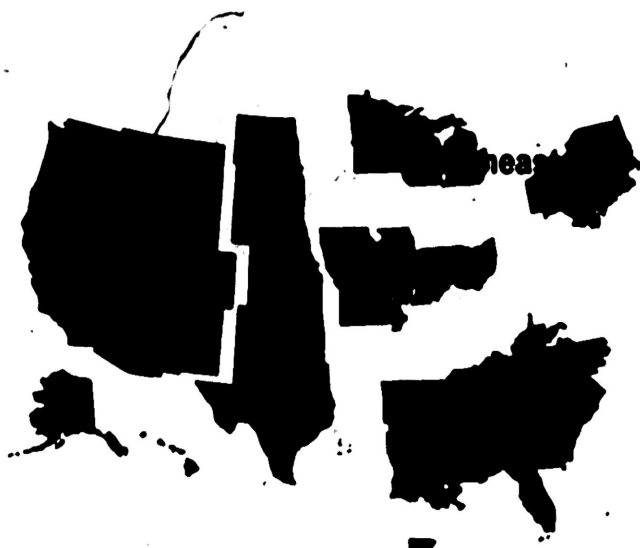
Figure 1.5 Regions of the United States

state level from the Economic Research Service-United States Department of Agriculture (ERS-USDA). These numbers will be aggregated into the aforementioned five regions. Regional financial performance measures that theoretically hold a causal relationship with loan delinquency and bankruptcy will be employed as independent variables in econometrically-estimated equations. For example, the times-interest-earned ratio, which measures the ability to cover interest expense from the farm's net cash flow, and debt burden ratio, which reflects the long-run coverage for outstanding debt, will be investigated.

The statistical package used will be Shazam. Seemingly Unrelated Regression (SUR) will be used to estimate a system of ten equations. The first five equations each represent the "percent of farm loan volume delinquent 30 days or more" dependent variable in each of the five regions. The last five equations represent the same five regions, but use the percent of farmers in the farm bank lending area who filed for bankruptcy as the dependent variable.

SUR will be used rather than Ordinary Least Squares (OLS) regression due to an a priori belief that the error terms between the regions are correlated. It seems logical that a random shock not accounted for in the model that affected one region will affect other regions as well. SUR will be used over pooling data because SUR allows the coefficients to differ across regions. However, the SUR model's coefficients will be tested to see if they are statistically different across regions. If no significant differences exist, the data will be pooled as this allows for the usage of more data points in the estimation of each coefficient.

Since only twelve years of data exist for the dependent variables, the model will be estimated using all twelve years. Therefore, model validation will consist of checking for proper signs and statistical significance of coefficients. All variables will be transformed into logs so that differences in coefficient values caused by scaling will be eliminated and coefficients can be interpreted as elasticities. Given the time series nature of the data, tests for autocorrelation will be performed.

Regional and national data on past dues is limited to the period, 1982-93. Thus, a test will be developed to determine if the model would differ had 1970s data on past dues been available. First, this study will find which independent variables create the best model for projecting regional financial stress using regional data (1982-93) on past dues as the dependent variable. Next, these same independent variables will be used in a national model that predicts past dues at the national level. The next step will be to find a proxy for past dues during the 1970s.

The Board of Governors of the Federal Reserve System publish data on the provision for loan and lease losses as a percentage of total loans at agricultural banks from 1970-93. Banks are legally required to set aside funds (i.e. make provisions for loan losses) for loans that are experiencing repayment problems. Thus, one should expect a high degree of correlation between the percent of loans that are 30 days or more past due and the allowance for loan losses as a percentage of total loans. To test this expectation, percent of loans past due will

ɔe regressed on the allowance for loan losses as a percentage of total loans. If the
fit is high (greater than 90 percent), allowance for loan loss will be used as a
proxy for past dues in the national model.

Since data on allowances, for loan loss are available at the national level
from 1970-93, a national model will be estimated for this time period. Next, the
null hypothesis that coefficients are not different between the two time periods
(1970-81 and 1982-93) will be tested using the Chow test. If the coefficients for
the two time periods are not statistically different at the national level, it should
alleviate some concern over the lack of 1970s data at the regional level.

Finally, the four policy conditions will be simulated using the regional
model. Given any of these four scenarios, the model will project a broad set of
indicators of financial stress at the regional level including the potential change
in delinquencies and bankruptcies at agricultural banks. Thus, policymakers,
agricultural lenders, farmers and others will be able to analyze the projected trends
in financial stress resulting from these policy changes.

Summary

In the 1980s, unforeseen financial stress resulted in the loss of billions of
dollars to U.S. farmers, agricultural lending institutions and U.S. taxpayers. These
losses legitimize this study's objective of applying estimated equations and other
economic and financial indicators useful in predicting aggregate financial stress
in agriculture. This study will analyze the regional financial stress results from

four government policy scenarios (two dealing with CRP, one focusing on target

price cuts and one regarding slower growth in the money supply).

CHAPTER II

REVIEW OF LITERATURE AND THEORETICAL CONSIDERATIONS

Introduction

The purpose of this chapter is to discuss previous studies and theories regarding a set of aggregate economic and financial indicators used in measuring aggregate financial stress in agriculture. Many of the measures discussed were previously developed and tested at the firm level. However, it seems logical to assume that these measures remain valid in assessing financial stress, even when firms are aggregated to the regional level.

Previous studies relevant to this research are summarized in the following three categories: (1) analyzing aggregate financial stress and risk, (2) the relationship between macroeconomy and financial sector and (3) financial ratios as predictors of financial stress.

Analyzing Aggregate Financial Stress and Risk

Despite considerable literature dealing with predicting the ultimate success or failure of an individual loan (i.e. credit scoring), little is written on assessing financial stress and its impacts at the aggregate level. One of the few aggregate studies was done by Hogan *et al.* in 1987. At the time, the authors found no precedent for their work, stating, "Somewhat surprisingly, no previous attempts to

build aggregate loan losses models could be found in the banking literature". Their study used stepwise regression to develop aggregate models that predicted loan losses for the entire loan portfolio of a bank in Idaho. The following four loan groups were modeled: consumer loans, agriculture loans, commercial loans and real estate loans. Although the consumer loan loss model had some success, the other three produced unsatisfactory results.

Shepard and Collins used aggregate U.S. data from 1910-78 to identify the determinants of failure in the agricultural sector. They identified aggregate real net farm income, average farm size (measured in acres), farm debt-to-asset ratio, and rate of non-farm failures as being significant explanatory variables. The importance of these variables varied when the analysis was divided into pre-WWII and post-WWII periods.

Oltmans developed aggregate models of Production Credit Association (PCA) and Federal Land Bank (FLB) loan quality using Ordinary Least Squares in a pooled cross section time series framework. The author analyzed loan quality and farm sector financial information for the St. Louis Farm Credit District. The estimated models explained much of the variation in quality of PCA loans from 1969-88 and in FLB loans from 1974-88 in the former St. Louis Farm Credit District. However, these models were unable to predict loan quality changes in advance. The author suggests future research in developing aggregate models adapted to different geographic regions as well as to assessing the loan quality of agricultural banks.

Conrad and DeBoer studied the determinants of rural property tax delinquency using pooled cross-section time series data for thirteen, agriculturally dependent Indiana counties over the 1970-84 period. These authors found that agricultural recession causes the property tax delinquency rate to increase. The explanatory variables used were: the farm debt-to-asset ratio, farm and non-farm income, and the ratio of the interest rate to the delinquency penalty rate.

Goodman examined the results from a survey of 37 U.S. commercial banks who lend to developing countries. Goodman reported three analytical approaches these banks used in evaluating countries with whom they do business. The vast majority of banks (32 of the 37 surveyed) used a qualitative system structured around discussion of a country's economic, political and social conditions and prospects. The most quantitative evaluation method was a checklist system. The checklist rating is derived by scoring the subject country with respect to indicators or variables that can be either quantitative or qualitative. Only one bank statistically tested the correlation between its checklist results and the actual repayment experience.

Group of Thirty published a report by a study group on international banking. The group found several problems with both the political and economic sides of country risk assessment systems. Serious problems existed in the quality and availability of data. In addition, lags in data reporting can be quite serious, sometimes rendering the available statistics virtually useless. Competitive pressures may lead banks to override country risk assessments and lend funds,

even though signs of economic difficulty may already be present.

Relationship between Macroeconomy and Financial Sector

Many articles have examined the causal relationship between the macroeconomy and the financial sector during the Great Depression. The guise of many arguments was the 1929-30 recession resulted in bank failures that, in turn, resulted in a further downturn in the economy, ultimately leading to the Great Depression. Friedman and Schwartz believed that the difficulty of banks worsened the general economy by reducing the wealth of bank shareholders and, more importantly, by leading to a rapid fall in the supply, of money.

Bernanke, extending Friedman and Schwartz's work, argued for a third way in which the financial crisis may have affected the economy. He believed the disruptions of 1930-33 reduced the effectiveness of the financial sector as a whole in performing its role as an intermediator between borrowers and lenders. This increased both the cost and difficulty of obtaining credit (especially for farmers, households and small firms). Thus, the credit squeeze decreased aggregate demand and turned the 1929-30 recession into the Great Depression.

There is an interesting relationship between what happened during the 1920-30s in the U.S. economy and the 1970-80s period for U.S. agriculture. In both cases, the demise of the latter decade (1930s and 1980s) was preceded by a huge increase in borrowing. Charles Persons documented the huge debt expansion of the 1920s:

- Corporate bonds and notes increased 80 percent
- Non-federal public securities grew 185 percent
- Urban, real estate mortgages increased 145 percent.

This is exactly the kind of huge increase in debt level that occurred in agriculture during the 1970s when farmers nominal aggregate debt increased over 242 percent.

Financial Ratios as Predictors of Financial Stress

One of the implicit assumptions that will be made in this study is that financial ratios can be used to predict financial stress and failure. This assumption is supported by several previous studies. Beaver (1966) empirically looked at whether financial ratios were actually good predictors of failure. He found the evidence overwhelmingly suggests that there is a difference in the ratios of failed and nonfailed firms. Also, the difference in ratios between failed and nonfailed firms was evident at least five years before failure, with the difference increasing as the year of failure approaches.

Beaver cited three other ratio studies that reached similar conclusions. First, FitzPatrick (1932) published a study of nineteen pairs of failed and nonfailed firms. His results indicated that there were persistent differences in the ratios for at least three years prior to failure. Second, Winakor and Smith (1935) investigated the mean ratios of failed firms for ten years prior to failure and found a marked deterioration in the mean values with the rate of deterioration increasing

as failure approached. Finally, Merwin (1942) compared the mean ratios of continuing firms with those of discontinued firms for the period of 1926 to 1936. He found mean differences for as much as six years before discontinuance.

Altman used a set of financial and economic ratios in an attempt to predict bankruptcies of manufacturing corporations. Multiple discriminant analysis was chosen as the statistical technique. The following explanatory variables were found to be significant: (1) working capital/total assets, (2) market value equity/book value of total debt, (3) retained earnings/total assets, (4) sales/total assets, and (5) earnings before interest and taxes/total assets. Altman found that bankruptcy can be accurately predicted up to two years prior to actual failure with the accuracy diminishing rapidly after the second year.

Penson (1987) argued for the use of additional indicators of financial stress in agriculture, besides the debt-to-asset ratio. His research concluded that three indicators (times-interest-earned ratio, financial leverage index, and debt burden ratio) of financial stress suggested that farmers ability to service their farm debt deteriorated long before the debt-to-asset ratio began to rise in the 1980s. For example, the debt-to-asset ratio varied less than two percent during 1970s, while times interest earned fell 80 percent from 1973 to 1980.

Theoretical Considerations

To begin with, financial stress needs to be defined. As stated in Jolly *et al.*, financial stress occurs when the capacity of an individual, a firm or a specific

sector of the economy to adjust to the forces causing stress is exceeded. Some stress is found in periods of growth. However, the extreme level of financial stress that occurred in agriculture during the 1980s was clearly unrelated to growth.

Jolly *et al.* also notes that there are few ambiguous measures of financial stress. Therefore, it is wise to consider several measures simultaneously when analyzing regional financial stress. Six measures of financial stress will be utilized in this study. Two of these six (percent of farm loan volume delinquent 30 days or more and percent of farmers who went bankrupt) will require econometric analysis prior to the simulation of alternative economic environments using AG-GEM.

The other four measures (times interest earned ratio, debt burden ratio, financial leverage index and debt-to-asset ratio) are definitional and will be computed directly from projected sector financial statements projected by AG-GEM. In fact, historical trends in the times interest earned ratio and the debt burden ratio will be investigated as potential explanatory variables in the econometric analysis of past dues and bankruptcies.

Definitions and Limitations of Financial Stress Measures

This section discusses three categories of financial measures often used in analyzing the level of financial stress. These categories are profitability, leverage, and the ability to service debt. Different measures within each category are defined. Also, their purpose and limitations are explained.

Profitability

Profitability is the essential key to the long term viability of any individual farm or the farm sector. Thus, one would expect a negative relationship between measures of profitability and measures of financial stress. The following three measures of profitability were considered in this study: real net cash farm income, return on assets, and return on equity.

In computing real net cash farm income (hereafter called real net income), nominal net cash farm income (published by the USDA-ERS) will be deflated by the Gross Domestic Price deflator with 1987 as the base year. The affect of inflation on the purchasing power of money is accounted for by using real, instead of nominal, net income. One of the problems with using the level of real net income is that it is an absolute measure of profitability. Thus, it does not allow for the possibility of scale differences between the regions or the level of capital required to produce this level of profit.

Ideally, one would prefer to have net income data calculated using the accrual method of accounting as it provides a more accurate picture of when revenues were earned and expenses incurred (Barry, Hopkin and Baker). Published financial statements for the sector as a whole are based on the cash method. Thus, revenue and expenses are recognized at the time cash is exchanged. Since these accounts are available on an annual basis only, however, the difference between measures of profitability and efficiency are lessened.

Return on assets (ROA) measures the farm sector's ability to generate

profits through the use of its assets. A common definition of ROA is net farm income before interest and income taxes less a charge for unpaid operator and family labor, all divided by total assets (using either beginning, ending or average total assets for the year).

Measuring net income before interest expense eliminates the influence of the method of financing on profitability. Subtracting unpaid labor recognizes the opportunity cost associated with the labor provided by the operator and his family. Since, aggregate data on unpaid labor does not exist, return on assets in this study is defined as:

$$(1) \quad ROA = \frac{\text{Net Cash Farm Income} + \text{Farm Interest Expense}}{\text{Ending Total Assets}}$$

One might think that ROA would varying depending on whether the beginning or ending value of total assets was utilized in its calculation. However, this study found that regardless of which total asset values were used, ROA differed less than one percent 81.74 percent of the time from 1971 to 1993. In fact, the largest difference never reached three percent in any region.

Return on Equity (ROE) measures the return to farmers' equity capital investment. On average, the ROE should exceed the ROA as owners have a higher level of risk than lenders. Owners higher risk results from lenders priority in receiving payment (principal and interest) on their capital investment and lenders must be satisfied first in the event of bankruptcy. For this study, the ROE

is defined as:

$$(2) \qquad ROE = \frac{\text{Net Cash Farm Income}}{\text{Ending Net Worth}}$$

Unpaid labor is not subtracted from the numerator, because of the lack of available data. As with ROA, it was found that ROE varied little, regardless of whether beginning or ending values were used in the denominator. The greatest difference between the two formulas for ROE was 3.23 percent and it was the only variation above three percent.

As indicators of farm profitability; both the ROA and ROE are thought to represent reasonably good measures of an industry's operating effectiveness (Foster). However, both measures can vary due to the accounting method used in the estimation of assets and liabilities. The two valuation methods are "cost" (a.k.a. "book value") and "market value". Under the cost method, land (and other non-depreciable assets) is valued at its purchase price (i.e. cost), while under the market value approach land is valued at its current market price.

Thus, during periods of declining (rising) market values of farm assets, the ROA and ROE measures are unaffected under the cost method of accounting. However, if assets are valued under the market method, both measures can overstate (understate) the operating effectiveness of farmers in periods of declining (rising) asset values. The problem lies in changes in the market value of equity of farm assets that are often largely attributable to unrealized equity gains or losses associated with changing land values, rather than realized gains or losses

associated with net income (Penson).

This problem is evident in Figure 2.1 which provides a comparison between real net cash income and the ROE in the Corn Belt region. Notice that ROE was higher in the mid- to late-1980s than in the mid- to late-1970s, even though real net income was lower in the 1980s. This is due to the loss in owners' equity resulting from the rapid fall of farm asset values in the 1980s. Figure 2.2 demonstrates that the ROA can also be a poor measure of profitability during periods of falling farm asset values like the 1980s. Thus, one would expect both the ROA and ROE to be poor indicators of regional financial stress in the 1980s as huge variations occurred in the market values of assets during this time period.

Leverage

Leverage, or solvency, ratios indicate the degree to which borrowed capital is used to supplement and extend equity capital. These ratios also indicate the financial risk exposure of the farm sector at a specific point in time. Financial risk is the added variability of returns arising from the fixed obligations associated with debt financing and cash leasing as forms of financial leveraging. Higher leverage magnifies the affects of changes in business risk on financial stress. Business risk is the risk confronted by the firm (such as yield, input price and output price risk) independent of its financial structure.

When the farm sector carries a high debt load, it increases the risk of loan delinquency and bankruptcy. Also, high debt affects liquidity since it creates

Percent $ Billions

Real Net Income

ROE
.....

Year
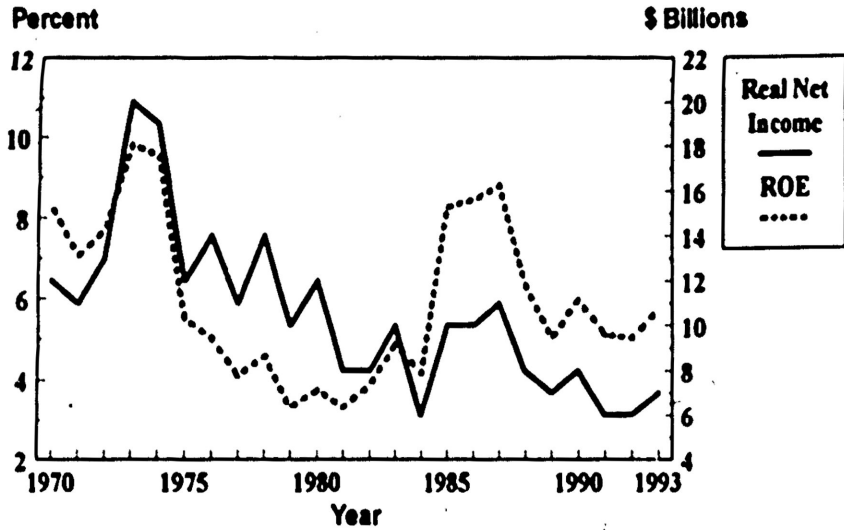
Figure 2.1. Comparison of Real Net Cash Farm Income and ROE
for the Corn Belt Region, 1970-93 (USDA-ERS 1994d)

Percent $ Billions

Real Net Income

ROA
.....

Year
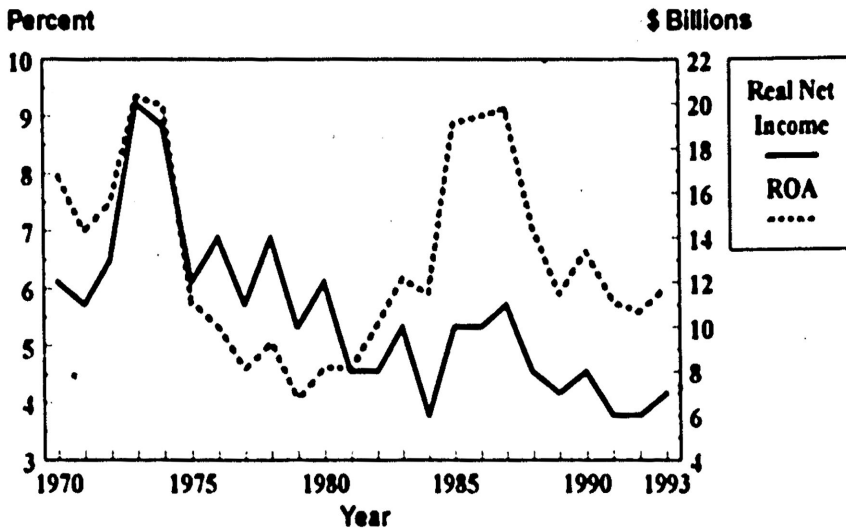
Figure 2.2. Comparison of Real Net Cash Farm Income and ROA
for the Corn Belt Region, 1970-93 (USDA-ERS 1994d)

higher current payment obligations, reduces credit reserves, and may lead to higher interest rates. Leverage, however, also can be a key factor in a farm's growth. Expected returns to equity holders are magnified through higher leverage. However, the downside affect can outweigh the upside affect, due to the fixed obligations to service debt (Oltmans 1990).

The debt-to-asset (D/A) and debt-to-equity (D/E) ratios are commonly used measure of solvency. Both ratios measure the relationship between the capital supplied by farm lenders (debt) and capital provided by the farmers (equity). As either ratio increases, so does the level of financial risk as lenders must be paid before equity owners in the event of bankruptcy.

Historically, the debt-to-asset ratio has been the most widely used measure of financial stress. However, several articles (Penson 1987; Lins, Ellinger and Lattz) have pointed out numerous deficiencies of using the D/A ratio as a measure of financial stress, especially when it is used as the sole measure. One of the problems of the D/A ratio as a measure of financial stress lies in the choice of accounting method used in the estimation of assets and liabilities. Valuation at "cost" or "book value" may yield a significantly different D/A ratio than a "market value" approach. Thus, during time of periods of rapid increases in land values, land owners D/A ratio will be less under the market method than the cost method.

This was especially evident during the 1970s when the market value of U.S. farmers' real asset value increased over 73 percent. Under the market value

approach, farmers' assets value increased enough to keep the D/A ratio basically constant, even though farmers increased their real debt level $95 billion in the 1970s. This result stands in stark contrast to the rapid rise in the D/A ratio that would have occurred if farm assets were appraised using the cost method.

In addition, Lins points out that the D/A ratio reveals little about the potential of the farm firm to generate income. If a farm's rate of return on assets exceeds its cost of debt, then a high D/A ratio represents an appropriate decision to benefit from a profitable operation. Thus, this ratio used alone is not capable of signalling financial stress.

The financial leverage index (FLI) uses the concepts of the return on equity and return on assets to overcome some of the problems in measuring and interpreting these rates of return, when assets are measured at market value (Penson; Fraser). The value of the index is calculated as follows:

$$(3) \qquad FLI = \frac{ROE}{ROA}$$

If the value of the FLI is above one, earnings per dollar of equity capital exceed the earnings per dollar on both equity and debt capital. This would imply that farmers are using leverage beneficially (i.e. returns from debt capital exceed the cost of debt capital).

Oltmans (1990) stated that a problem existed with using FLI to estimate financial stress. He argued the problem was apparent when FLI was broken down into its component parts. Oltmans stated that FLI is comprised of a balance sheet

leverage measure (D/E) and an income statement coverage measure (TIE). He stated that FLI can increase (a desirable situation) as a result of leverage (D/E) increasing and interest coverage (TIE) decreasing. In other words, FLI could signal an improving situation even when financial risk was actually increasing. He also noted that FLI has no meaning if both ROA and ROE are negative and that FLI is undefined if ROA equals zero.

Debt Service

The times interest earned (TIE) ratio in this study was calculated as:

$$(7) \quad TIE = \frac{(Net\ Cash\ Farm\ Income + Farm\ Interest\ Expense)}{Farm\ Interest\ Expense}$$

This ratio measures the farm sector's ability to pay interest obligations on their borrowed capital out of operating profit. An inability to meet these obligations will ultimately result in bankruptcy or foreclosure.

As TIE increases, farmers have an increased ability to meet all interest obligations and the likelihood of bankruptcy decreases. Thus, there is a negative relationship between financial stress and TIE. A weakness of TIE is that it only considers the interest obligation on outstanding debt and does not address the need to repay the outstanding principal.

Financial lending institutions calculate ratios to measure a borrower's ability to repay both principal and interest. A common debt coverage measure is (Net

Cash Farm Income minus family living expenses minus Income Taxes plus Nonfarm Income) / (Principal and Interest Payments). However, data limitations require a modification to this ratio. Family living expenses, income taxes, nonfarm income, and principal payment data are not available at the aggregate level. Therefore, a proxy for this debt coverage measure is used.

The debt burden (DNI) ratio for this study is defined as:

$$(8) \quad DNI = \frac{\text{Total Liabilities}}{\text{Net Cash Farm Income}}$$

The debt burden ratio is a means of assessing the burden placed upon working capital from operations to retire debt obligations (Foster). Financial stress is positively related to this ratio. As this ratio increases, farmers face increased pressure in meeting their debt repayment obligations; the size of their debt relative to their ability to service this debt has increased. Table 2.1 summarizes the variables that will be considered in the initial model specification and estimation.

Other Measures

Some common measures of financial condition could not be calculated due to lack of data. These include liquidity measures (current ratio, working capital), as well as asset management ratios (inventory turnover). Government farm program payments have been considered as a possible explanatory variable in

previous studies. However, for this study it was included in net cash farm income, due to the need to minimize the number of independent variables in the model.

Table 2.1. Possible Determinants of Regional Financial Stress

Category	Empirical Measure	Acronym	Expected Relationship to Financial Stress[*]
PROFITABILITY	Real Net Cash Farm Income	RNI	-
	Return on Assets	ROA	-
	Return on Equity	ROE	-
LEVERAGE	Debt-to-Asset Ratio	D/A	+
	Debt-to-Equity Ratio	D/E	+
	Financial Leverage Index	FLI	-
DEBT SERVICE	Times Interest Earned Ratio	TIE	-
	Debt Burden Ratio	DNI	+

[*]Financial stress is measured as the percent of farm loan volume delinquent 30 days or more at a financial institution and percent of farmers in the institution's lending area who filed for bankruptcy.

Summary

As previous authors have emphasized, it is important to consider several different financial measures when analyzing financial stress. When viewed in isolation, each measure suffers from a myopic view. However, when these measures are jointly considered, their combined explanatory power is greatly improved.

CHAPTER III

MODEL ESTIMATION AND VALIDATION

Introduction

The purpose of this chapter is to report the coefficient estimates developed in this study and discuss the results of various methods used to validate the regional financial stress model. The first section outlines this study's model, explains the assumptions for its selection and reports the results from the test of these assumptions. The second section details validation methods, the model's coefficient estimates, their statistical significance, R^2 and test results for autocorrelation. Next, a test for structural change is developed. The fourth section reports the results of forecasting the model using within sample data. The final section summarizes the contents of this chapter.

It is important to be very specific regarding the intended purpose of this study's model. The regional financial stress model was developed as a predictive model for use in policy analysis. Thus, the specific purpose of the model is to provide information regarding the regional impact various policy alternatives would have on farmers debt service ability and survivability. Therefore, establishing the trend and direction of change is more important than making specific forecast that might serve as an input to an aggregative credit scoring model. It is hoped that policymakers and others can analyze the model results to

evaluate the potential affects of various policy alternatives.

Regional Financial Stress Model and Assumptions

The model used to project regional financial stress was estimated using the

following system of ten equations (two equations for each of five regions):

(1) $PD_{ti} = f$ (Lagged PD_{ti} , Times-Interest-Earned Ratio$_{ti}$)

(2) $B_{ti} = f$ (Lagged B_{ti} , Lagged Debt Burden Ratio$_{ti}$)

where:
   PD_{ti} is percent of farm loans past due 30 days or more in region i
   (i= West, Plains, Northeast, Corn Belt and South) at time t (t= 1982-1993).

   B_{ti} is percent of farmers in bank lending area who went bankrupt in
   region i (i =West, Plains, Northeast, Corn Belt and South) at time t
   (t= 1982-1993).

   Times-Interest-Earned Ratio and Debt Burden Ratio were defined earlier
   in equations (7) and (8) on pages 31 and 32.

These ten equations were estimated using Seemingly Unrelated Regression (SUR).

SUR was chosen based on two initial assumptions: the error terms between

regions were correlated and coefficients varied across regions. Both of these

assumptions were tested.

The Breusch-Pagan LM test (see Kmenta Ch. 8) was performed to test the

null hypothesis that the error terms were not correlated between regions. This null

hypothesis was rejected as the test statistic (122.66) was greater than the critical

value (50.892) at a significance level of 0.01. Thus, it is assumed that the error

terms are correlated. This assumption is appealing since one would expect that a random shock not accounted for in the model that affected one region, should also affect other regions. Because the error terms were correlated. Ordinary Least Squares (OLS) regression could not be used as OLS assumes the error terms are independent.

The second assumption tested was that coefficients varied across regions. It was hypothesized that coefficients should vary across regions, due to explanatory variables having varying impacts across regions. For example, in a regional model predicting past due loans, one might expect the times interest earned ratio's coefficient to vary between the regions with the highest and lowest levels of debt. The null hypothesis that the coefficients are the same for all regions was tested. All four independent variables' coefficients were statistically different across regions at an alpha level of 0.05. Thus, data could not be pooled, because pooling does not allow the coefficients to vary across regions. .

Results of Model Estimation

Model validation is important in any empirical analysis. However, there are many approaches to model validation and validation is fundamentally subjective. McCarl and Apland discuss some of the inherent problems with model validation. Modelers choose the validity tests, the criteria for passing the tests, what model outputs to validate, what setting to test in, what data to use, etc. Thus, the assertion "the model was judged valid" can mean almost anything. Nonetheless,

a model validation effort reveals a model's strengths and weaknesses which is valuable to users and those who obtain information from model results. The ultimate test of validity deals with adoption of the model by the decision maker.

In this study, model validation will consist of checking for proper signs and statistical significance of coefficients and forecasting the model. Due to the limited number of observations for the dependent variables, all twelve years of data will be used in model estimation Therefore, the model will only be forecasted using within sample data.

All variables were transformed into logs, so that differences in coefficient values caused by scaling were eliminated and coefficients can be interpreted as elasticities. However, it should be noted that with elasticities one assumes the coefficients are constant over time. If the numbers were in "natural terms" the elasticities could change over time.

The coefficient estimates for each of the five regions' past due and bankruptcy equations are listed in Tables 3.1 and 3.2, respectively. All of the variables were statistically significant (alpha = 0.05) and of proper sign. The R^2 coefficient (also reported in Tables 3.1 and 3.2) measures how much of the total variation in the dependent variable that the model explains. Thus, the regional past due equations explained between 64 and 84 percent of the variation in regional past dues. The regional bankruptcy equations explained between 48 and 86 percent of the variability in regional bankruptcies.

As expected, a positive relationship exists between the dependent variables (past dues and bankruptcies) and the lag of these variables (i.e. LPD and LB). The times interest earned ratio (TI) coefficients are all negative; this ratio should have a negative relationship with past due loans, as the more "times" one is able to cover interest expense the less likely one is to be delinquent on loan repayment.

Table 3.1. Past Due Model Regression Coefficients*

	West	Plains	Northeast	Corn Belt	South
Intercept	2.6307	1.5471	2.3482	1.3717	2.9379
	(10.99)	(4.15)	(4.96)	(5.35)	(15.19)
LPD	.15157	.49645	.35716	.64427	.13239
	(2.33)	(4.35)	(3.39)	(6.94)	(3.02)
TI	-1.1395	-.85322	-1.0955	-.9316	-1.3845
	(-8.55)	(-4.17)	(-4.03)	(-5.35)	(-14.43)
R²	.78	.84	.64	.81	.74
Durbin-h	.87	.28	.58	.86	.10

* All coefficients are of proper sign and significant at the 0.05 level. T-Ratios are in parenthesis.

A positive correlation between bankruptcy and the lag of the debt burden ratio (LDNI) is expected. As the ratio of farm debt to net cash farm income increases, so does the probability that the farmer will be unable to meet all his long-term obligations (especially principal payments), resulting in bankruptcy. All debt burden ratio coefficients are positive in the five bankruptcy equations.

Table 3.2 . Bankruptcy Model Regression Coefficients*

	West	Plains	Northeast	Corn Belt	South
Intercept	-.14908	-.15529	-.38814	-.62365	-.5075
	(-0.55)	(-0.52)	(-2.34)	(-3.04)	(-3.51)
LB	.44765	.38605	.52803	.63667	.29855
	(5.79)	(3.55)	(7.44)	(6.46)	(13.58)
LDNI	.5569	.40486	1.0049	.63419	1.3102
	(2.67)	(1.95)	(6.08)	(5.43)	(10.43)
R^2	.58	.48	.78	.66	.86
Durbin-h	.47	.30	1.05	-.15	-.14

* All coefficients are of proper sign and significant at the 0.05 level.   T-Ratios are in parenthesis.

Given the time series nature of the data, tests for autocorrelation were performed. Since both the past due and bankruptcy equations included a lagged dependent variable, the Durbin-h test for autocorrelation was used. The results of this test are reported in Tables 3.1 and 3.2. In all cases, the test statistics were well below the critical value (1.645) at a significance level of 0.05. Thus, autocorrelation is not present in any of the ten equations.

Test for Structural Change

After specification of the regional equations was completed, a test was developed to try and draw some inferences about the affect of not having 1970s data on the dependent variables at the regional level. The test was comprised of

the following steps:

1) Develop the regional model for past dues using data from 1982-93.

2) Develop a national model using the same independent variables (i.e. lagged past dues and times interest earned ratio) the regional model used. National model's coefficients were all proper sign, statistically significant (alpha = 0.05), R^2 = 0.84 and no autocorrelation.

3) Find a proxy for past dues, as data on past dues is only available from 1982-93.

4) Regress percent of loans past due on the allowance for loan losses as a percentage of total loans (this is the proxy) for the period 1982-93. The correlation was 91.24 percent. So, allowance for loan losses as a percentage of total loans was used as a proxy for percent of loans past due in the national model.

5) Run a Chow test to determine if the coefficients are statistically different between a national model estimated with data from 1971-82, versus, 1983-1993. Result: Failed to reject null hypothesis that coefficients do not differ. Chow = 2.73 < 3.2 = F distribution with DF1 = 3 and DF2 = 17, at alpha = .05.

Thus, the coefficients were not statistically different between the two time periods (1971-82 and 1983-1993) in the national model. Therefore, it is entirely possible that the current regional model's coefficients would not be significantly different even if 1970s data on past dues had been available and used to estimate the regional model.

Forecasting Regional Model Using Within Sample Data

Ideally, one would like to have enough observations to split them into two sets: within- sample data and out-of-sample data. Within-sample data is normally

used to estimate the model. Next, the model is forecast using out-of-sample data. One form of model validation is to then compare how closely the models projections matched the actual historical outcomes contained in the out-of-sample data. Unfortunately, for this study, there simply are not enough years of data available to divide the sample and perform out-of-sample forecasts. This data deficiency stems from the fact that before the early 1980s, information regarding two of this study's measures of regional financial stress in agriculture (past dues and bankruptcies) was not collected and published. Thus, all twelve years of data (1982-93) were used to estimate this study's model.

Due to these data limitations, a weaker form of model validation was utilized. This validation process involved examining the results of forecasting this study's model within sample, using the same data that was used to estimate the model. If the model performs poorly here, it is highly unlikely it will be able to successfully predict future outcomes

Forecasted results are presented in this chapter in table form for each of the five regions. They are also presented graphically in the appendix (Figures B1 - B10). The tables present a comparison between the regional forecast results and the actual past dues and bankruptcies that occurred from 1983-1993.

One of the main objectives of this study's model is the ability to predict the trends and changes in the direction of past dues and bankruptcies. Based on this criteria, a prediction was considered accurate if its yearly change in direction matched the actual value's change in direction. For instance, if the model

predicted past dues in the West region would decrease from 1987 to 1988 and past dues actually did decrease, then the model's projection for 1988 was considered acceptable. Forecasts were also considered accurate if they were within ten percent (+ or -) of the actual value.

Based on this criteria, the past due models' forecasts for both the West and Corn Belt regions were accurate for nine of the eleven years forecast. The Plains, Northeast and South were projected correctly for seven, six and five years, respectively. Of the 55 years forecast (i.e., 11 years * 5 regions) for past dues, 36 years were forecast correctly (65 percent). The past due model performed poorest during the period 1985-1986 when past dues were at their peak. None of the regional models forecasts were correct in 1985 and only two (West and Corn Belt) were accurate in 1986. Tables 3.3 - 3.7 provide within sample forecasts for each of the individual region's (West, Plains, Northeast, Corn Belt and South) past dues and bankruptcies.

In forecasting bankruptcies, the highest accuracy was achieved in the Northeast region (nine years correct) while the worst was in the Corn Belt with only six years forecast correctly. The remaining three regions (West, Plains and South) were all forecast correctly eight times. Thus, despite the low R^2 for both the West and Plains region model (.58 and .48, respectively), these regions' forecasts were accurate over 72 percent of the time. Of the 55 years forecast (i.e. 11 years * 5 regions) for bankruptcies, 39 years were forecast correctly (71 percent). The bankruptcy model performed worst during the period 1992-1993.

Two of the regional models forecasts were correct in 1992 (West and Northeast) and only one (South) was accurate in 1993.

Summary

This chapter reported the coefficient estimates for both the past due and bankruptcy models. The regional past due equations explained between 64 and 84 percent of the variation in regional past dues. The regional bankruptcy equations explained between 48 and 86 percent of the variation in regional bankruptcies. The coefficient estimates in both models were all found to be of proper sign and statistically significant. Tests for autocorrelation and structural change were negative.

Table 3.3. Within Sample Forecasts of West Region's Past Dues and
Bankruptcies

Year	Past Dues Actual	Past Dues Predicted		Bankruptcy Actual	Bankruptcy Predicted	
1983	4.5	5.9		1.2	1.5	
1984	5.0	5.1	*	2.3	2.5	*
1985	8.0	4.8		3.5	3.0	*
1986	5.2	4.1	*	3.5	3.4	*
1987	3.2	3.1	*	3.0	2.9	*
1988	2.3	2.6	*	2.0	2.4	*
1989	1.6	2.2	*	2.1	1.9	*
1990	1.4	2.0	*	1.3	1.9	
1991	3.0	2.1	*	1.2	1.5	*
1992	2.0	1.9	*	2.9	1.6	*
1993	1.4	1.6	*	2.8	2.2	

* Represents predicted values within 10 percent (+ or -) of actual values and/or changes in the direction of predicted values that match actual values changes in direction.

Table 3.4. Within Sample Forecasts of Plains Region's Past Dues and
Bankruptcies

Year	Past Dues Actual	Past Dues Predicted		Bankruptcy Actual	Bankruptcy Predicted	
1983	3.5	4.0		0.9	1.6	
1984	4.1	4.0	•	2.3	1.7	•
1985	4.4	3.5		3.7	2.5	•
1986	6.6	3.5		3.9	2.6	•
1987	2.9	3.6		2.6	2.5	•
1988	1.9	2.3	•	2.0	2.0	•
1989	1.7	1.9	•	1.9	1.8	•
1990	1.4	1.6	•	0.8	1.7	•
1991	1.4	1.3	•	1.3	1.2	•
1992	1.0	1.2	•	1.1	1.4	
1993	1.0	0.9	•	1.6	1.3	

• Represents predicted values within 10 percent (+ or -) of actual values
and/or changes in the direction of predicted values that match actual values
changes in direction.

Table 3.5. Within Sample Forecasts of Northeast Region's Past Dues and
Bankruptcies

Year	Past Dues Actual	Past Dues Predicted		Bankruptcy Actual	Bankruptcy Predicted	
1983	3.5	4.5		1.0	1.3	
1984	5.3	5.1	*	2.6	2.2	*
1985	6.9	4.0		4.0	3.8	*
1986	6.9	3.2		3.9	3.4	*
1987	2.9	2.5	*	3.3	2.9	*
1988	1.4	2.3	*	2.4	2.2	*
1989	1.9	2.3		1.5	2.0	*
1990	1.6	2.3		1.2	1.6	*
1991	2.5	2.3	*	1.4	1.5	*
1992	1.5	2.0	*	1.5	1.7	*
1993	1.8	1.8	*	2.5	1.6	

* Represents predicted values within 10 percent (+ or -) of actual values
and/or changes in the direction of predicted values that match actual values
changes in direction.

Table 3.6. Within Sample Forecasts of Corn Belt Region's Past Dues and Bankruptcies

Year	Past Dues Actual	Past Dues Predicted	Bankruptcy Actual	Bankruptcy Predicted
1983	3.5	3.8 •	1.0	1.4
1984	4.3	4.3 •	2.3	1.5 •
1985	5.2	3.2	3.3	3.3 •
1986	5.4	3.4 •	4.0	2.7
1987	2.3	2.9 •	3.4	2.9
1988	1.5	1.9 •	2.0	2.2 •
1989	1.1	1.6 •	1.5	1.8 •
1990	1.1	1.1 •	1.1	1.7 •
1991	1.5	1.2 •	1.3	1.2 •
1992	1.1	1.4	1.1	1.5
1993	1.0	0.9 •	1.7	1.3

* Represents predicted values within 10 percent (+ or -) of actual values and/or changes in the direction of predicted values that match actual values changes in direction.

Table 3.7. Within Sample Forecasts of South Region's Past Dues and
Bankruptcies

Year	Past Dues Actual	Past Dues Predicted		Bankruptcy Actual	Bankruptcy Predicted	
1983	4.3	5.2		1.9	2.0	*
1984	4.0	4.2	*	4.9	5.5	*
1985	4.2	3.2		5.7	5.7	*
1986	5.2	3.1		6.5	4.8	
1987	3.0	2.4	*	5 9	4.6	*
1988	1.3	1.8	*	3.3	3.4	*
1989	1.3	1.5		2.0	2.4	*
1990	0.8	1.5		1.2	1.8	*
1991	2.1	1.2		2.3	1.6	
1992	1.2	1.1	*	1.8	2.0	
1993	0.7	1.0	*	1.6	1.6	*

* Represents predicted values within 10 percent (+ or -) of actual values and/or
changes in the direction of predicted values that match actual values changes
in direction.

CHAPTER IV

PROJECTION RESULTS

Introduction

The purpose of this chapter is to analyze the regional results from four policy scenarios using six measures of financial stress. Results are analyzed by comparing regional financial stress measures from each of three scenarios to a baseline scenario. For this study, the baseline scenario assumes that the CRP is eliminated. The other three scenarios being compared to the baseline are: (1) a continuation of CRP, (2) a ten percent reduction in target prices, and (3) a two percent reduction in the growth rate of the money supply. All of the scenarios are projected from 1994 to 2000.

Two of the six measures of financial stress analyzed are the percentage of agricultural bank loans to farmers that are 30 days or more past due and the percentage of farmers within an agricultural bank's lending area that went bankrupt during the period. These two measures were projected using equations that are explained in Chapter III. The other measures calculated are: the times-interest-earned ratio, the debt burden ratio, the financial leverage index, and the debt-to-asset ratio. Since all six of the above measures are based on projections made by the AG-GEM simulation model, the following section discusses the assumptions underlying the model's projections.

AG-GEM Assumptions

The following five variables were projected under each of the four scenarios over the 1994-2000 period by the AG-GEM simulation model:

- net cash farm income

- total farm assets

- total farm debt

- total farm interest expense

- government farm program costs

Each of the four scenarios assumed:

- Target prices remain frozen to the year 2000, except for the one scenario where target prices are reduced by ten percent.

- Costs of production increase roughly with the rate of inflation. Thus, frozen nominal target prices and rising costs result in a price squeeze that tends to cause farmers' net income to fall.

- A moderately "strong" dollar that dampens export growth. The dollar is even stronger under the one scenario that slows the growth rate of the money supply by two percent.

- CRP is eliminated (except for CRP continuation scenario), with 75 percent of CRP land coming back into production. This increases the supply of farm program crops (wheat, feedgrains, etc.) causing market prices to fall. This causes deficiency payments to increase.

The return of CRP land to production, coupled with lower net returns to farmers, will cause farm asset values (mainly land) to fall slightly. Farmers debt levels increase slightly, but higher interest rates cause interest expense to increase dramatically.

Discussion of Baseline

Currently, considerable debate exists over whether the CRP should be eliminated (baseline) or continued. Participants on both sides of the debate should be interested in analyzing the financial stress projections from both scenarios. However, before comparing the financial stress projections from these scenarios related to CRP, a brief description of the CRP is provided.

The CRP was established by Congress in the 1985 Farm Act as a voluntary long-term cropland retirement program. About eight percent of U.S. cropland (36.4 million acres) has been enrolled in the CRP in 12 separate signups during the March 1986 to June 1992 time period. The USDA provides CRP participants with half the cost of establishing a permanent land cover (usually grass or trees) and an annual per-acre rental in exchange for retiring highly erodible or other environmentally sensitive cropland for ten years. (USDA-ERS).

CRP acres are concentrated largely in the Plains and western portion of Corn Belt regions defined in this study. Nearly 60 percent of the CRP acreage scheduled to come back into production in 1996-1999 is located in these regions. The annual CRP rental payments made by USDA to participating farmers total $1.8 billion and average $50 per acre.

Contracts covering two million CRP acres were originally scheduled to expire in 1995, but these contracts were extended one year. Additional contracts on more than 22 million acres will expire in 1996 and 1997. Recent surveys by the Soil and Water Conservation Society (SWCS) indicate that without CRP

extensions, farmers would return 54 to 74 percent of their CRP acres to crop production, depending on commodity prices. (USDA-ERS). Thus, the expiration of CRP contracts raises several issues, including the ultimate affects a return of CRP land to production will have on farmers.

Discussion of Baseline Projections

This section begins by discussing the change from 1994 to 2000 in the five variables projected by AG-GEM under the baseline scenario. An analysis is then provided on how these five variables affect the six measures of financial stress examined in this study.

Major Farm Sector Variables

Total Farm Assets. At the U.S. level, farm asset values fall $21.6 billion (2.5 percent) from 1994 to 2000 under the baseline (CRP eliminated) scenario. This is mainly due to the return of CRP land to production. This return increases the amount of land on real estate markets, and thus drives down farm land values. The value of farm assets in all but the West region are projected to decrease from 1994 to 2000.

This decrease ranges from a 0.54 percent drop in the South to a 5.12 percent decline in the Plains. Both the Northeast and Corn Belt regions' asset values will fall 4.32 percent. The West region's asset values will experience a 5.3 percent growth in asset value from 1994 to 1996. However, when CRP land comes back

into production (starting in 1997), the West's asset values fall 3.5 percent from 1996 to 2000. Overall, the West experiences a slight growth (1.77 percent) in asset value from 1994 to 2000.

Total Farm Debt and Interest Expense. Farmers' total debt is projected to increase a total of $12.8 billion (9.22 percent) from 1994 to 2000 under the baseline scenario. Some of the land currently held in the CRP is owned by individuals who do not have the equipment or desire to bring this land back into production. It is expected that some of the CRP land will be sold when CRP contracts expire. Thus, debt increases because farmers borrow to purchase land formerly owned by CRP participants and make the capital expenditures necessary to bring this land back into production.

The percentage increase in debt (from 1994 to 2000) ranges from 5.48 percent in the Corn Belt to 12.6 percent in the South. The other regions (Northeast, Plains and West) debt increased by 6.4, 9.18 and 11.21 percent, respectively. Although farm debt increases modestly, farm interest expense increases substantially due to higher interest rates. Farmers in the Plains region can expect their interest expense to increase 40.7 percent from 1994 to 2000. The remaining regions all have projected increases between 25.6 (Northeast) and 33.1 (Corn Belt) percent.

Government Farm Program Costs. Despite the annual $1.8 billion savings

in CRP payments if CRP is eliminated, government farm program costs would actually increase $4 billion from 1994 to 2000. This increase results from higher deficiency payments that result from lower market prices for farm program crops. Crop prices are lower due to CRP land coming back into production which increases the supply of crops. Farm program payments increase dramatically in the Plains (70 percent), Northeast (85 percent) and Corn Belt (111 percent) if CRP is eliminated. The West and South receive a 12 and 10 percent increase, respectively.

Net Cash Farm Income. Northeast farmers should see an 11 percent ($1.02 billion) decrease in annual net cash farm income by the year 2000. The Plains and Corn Belt regions should experience decreases of 5.04 and 5.96 percent, respectively. These decreases are mainly the result of a price-cost squeeze. U.S. farmers face a price-cost squeeze resulting from target prices being frozen at 1990 levels, while the costs of production increase roughly with the rate of inflation. In the year 2000, it is projected that approximately 41 percent of farmers net cash farm income (in the Plains and Corn Belt) will come from government payments.

Only the West and South regions are expected to experience positive growth in net cash farm income. Net cash farm income is expected to increase $1.33 billion (10.96 percent) in the West and $1.43 billion (8.85 percent) in the South from 1994 to 2000. . Recall, that these same two regions received the smallest increase in government payments. Thus, it seems logical to assume that these two

regions are not as heavily dependent on farm program crops.

Measures of Financial Performance

Debt-to-Asset Ratio. For all regions, the debt-to-asset ratio increases under the baseline scenario from 1994 to 2000. This is expected, since debt increased from 1994 to 2000 in every region. In addition, asset values fell in every region, except the West. The West's debt-to-asset ratio increased because the 11.2 percent increase in debt outweighed the 1.77 percent growth in assets (1994 to 2000). The most noticeable change in the debt-to-asset ratio occurs in 1997. This change results from asset values starting to fall as CRP land comes back into production. Figures 4.1 through 4.5 display baseline projections (1994 to 2000) for the six measures of financial stress used in this study.

The Northeast region has the lowest projected ending (0.14) debt-to-asset ratio. The highest leverage ratio occurs in the Plains and South regions. Both regions debt-to-asset ratios increase from 0.17 to 0.20 (1994 to 2000). The West and Corn Belt leverage ratios start at 0.16 and increase to 0.18 and 0.17, respectively.
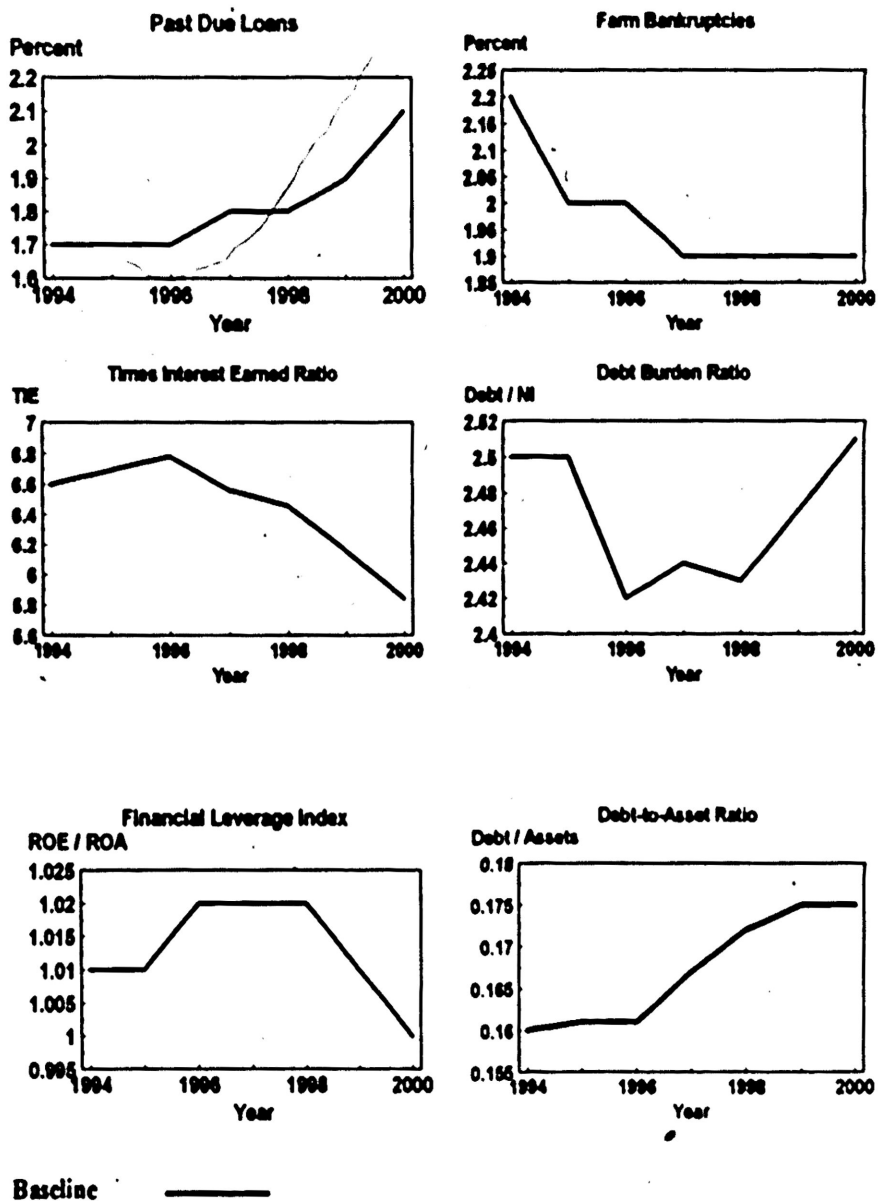
Figure 4.1. Baseline Financial Stress Measures for the West Region
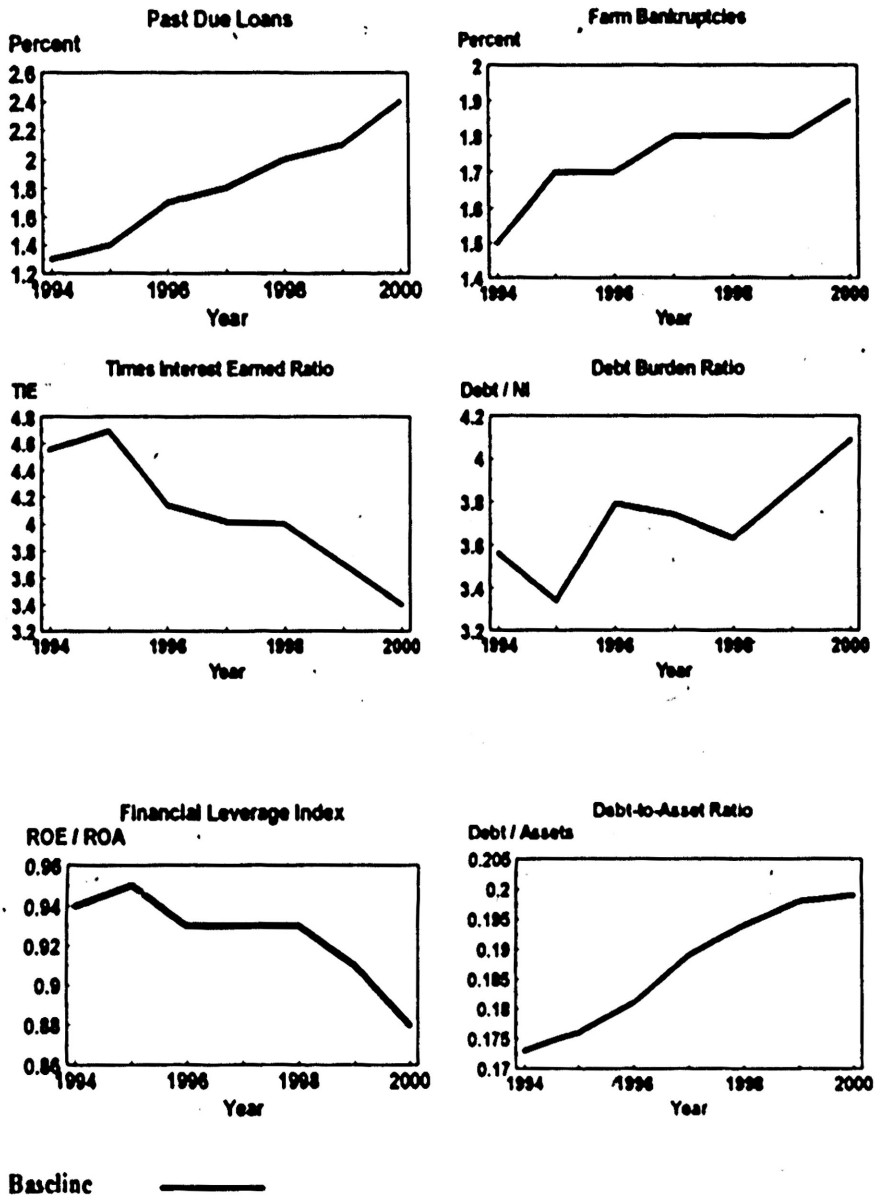
Figure 4.2. Baseline Financial Stress Measures for the Plains Region
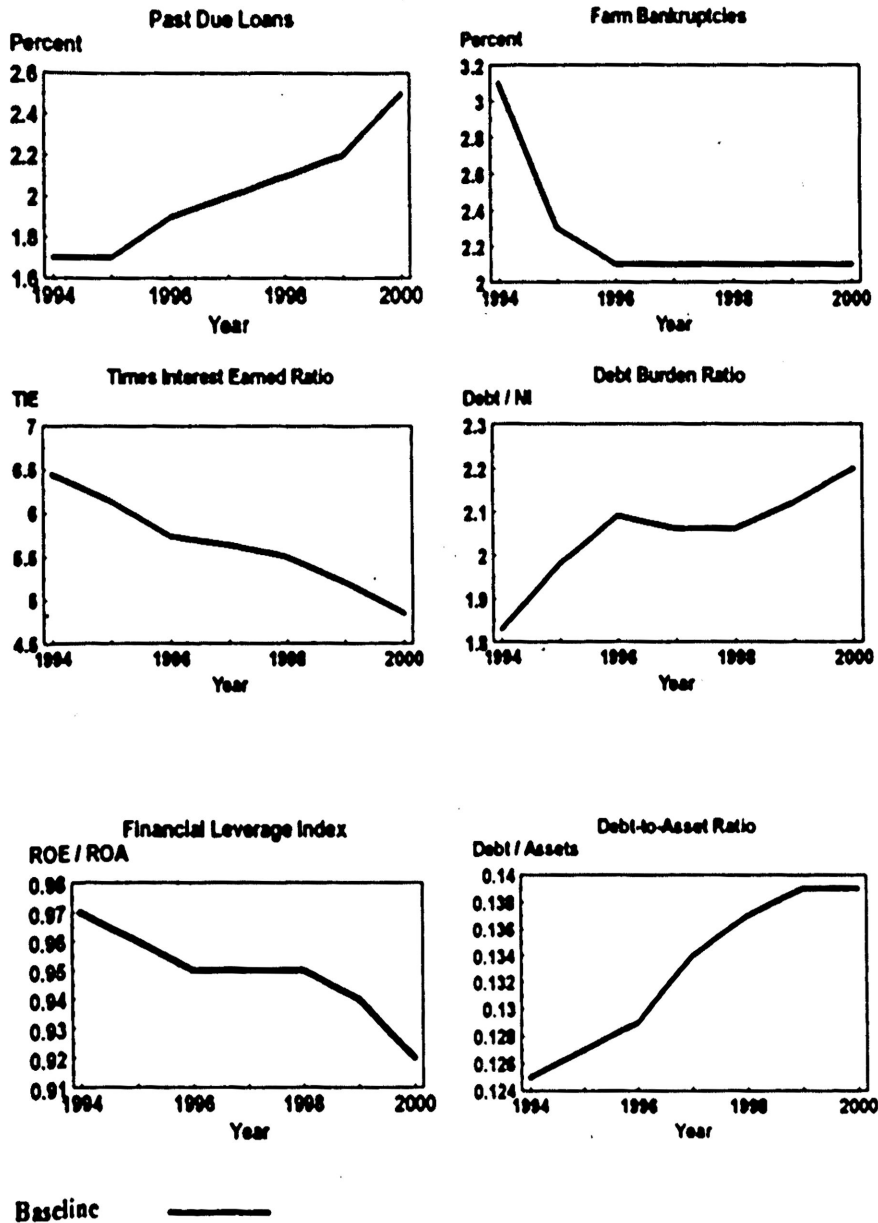
Figure 4.3. Baseline Financial Stress Measures for the Northeast Region

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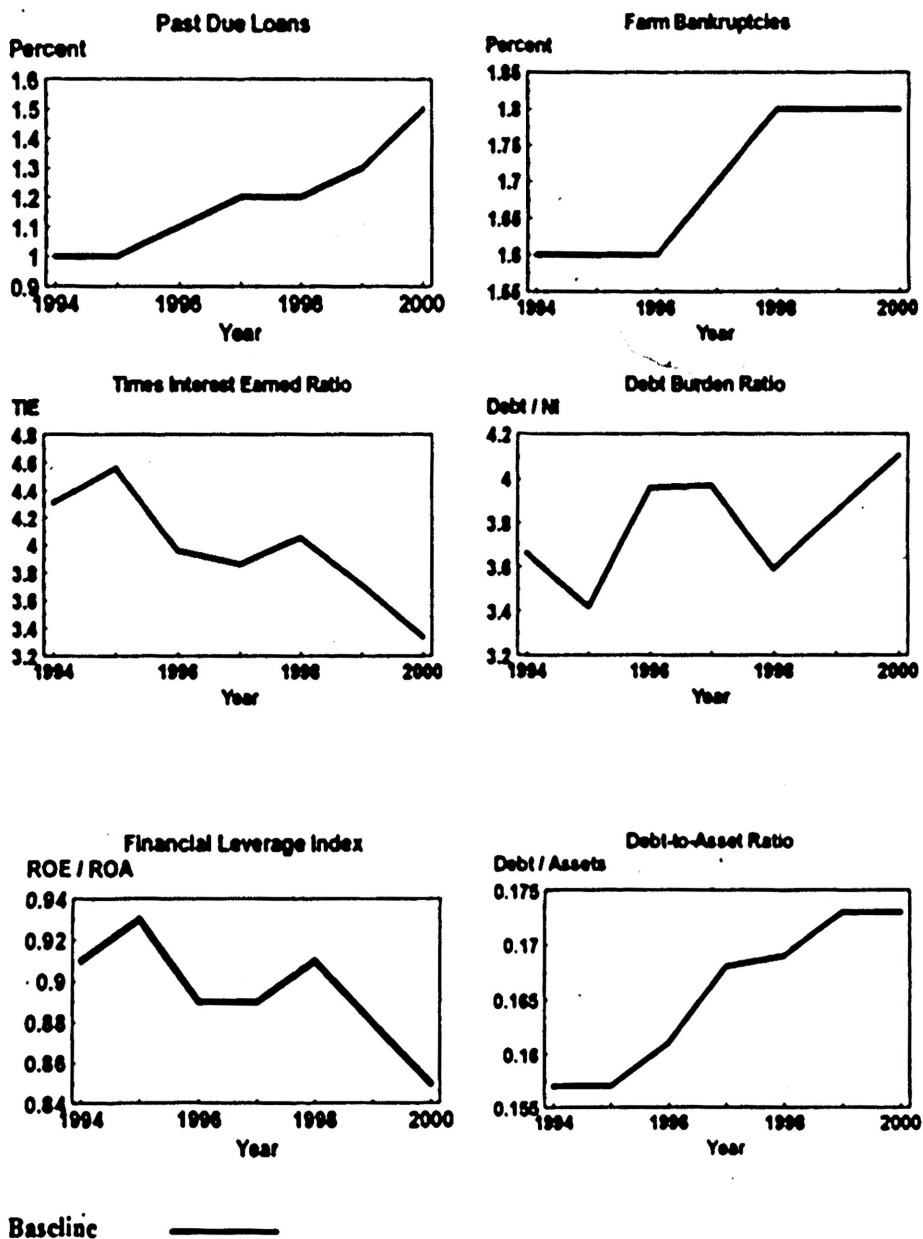
Figure 4.4. Baseline Financial Stress Measures for the Corn Belt Region

Past Due Loans

Percent

Farm Bankruptcies

Percent

Times Interest Earned Ratio

TIE

Debt Burden Ratio

Debt / NI

Financial Leverage Index

ROE / ROA

Debt-to-Asset Ratio

Debt / Assets
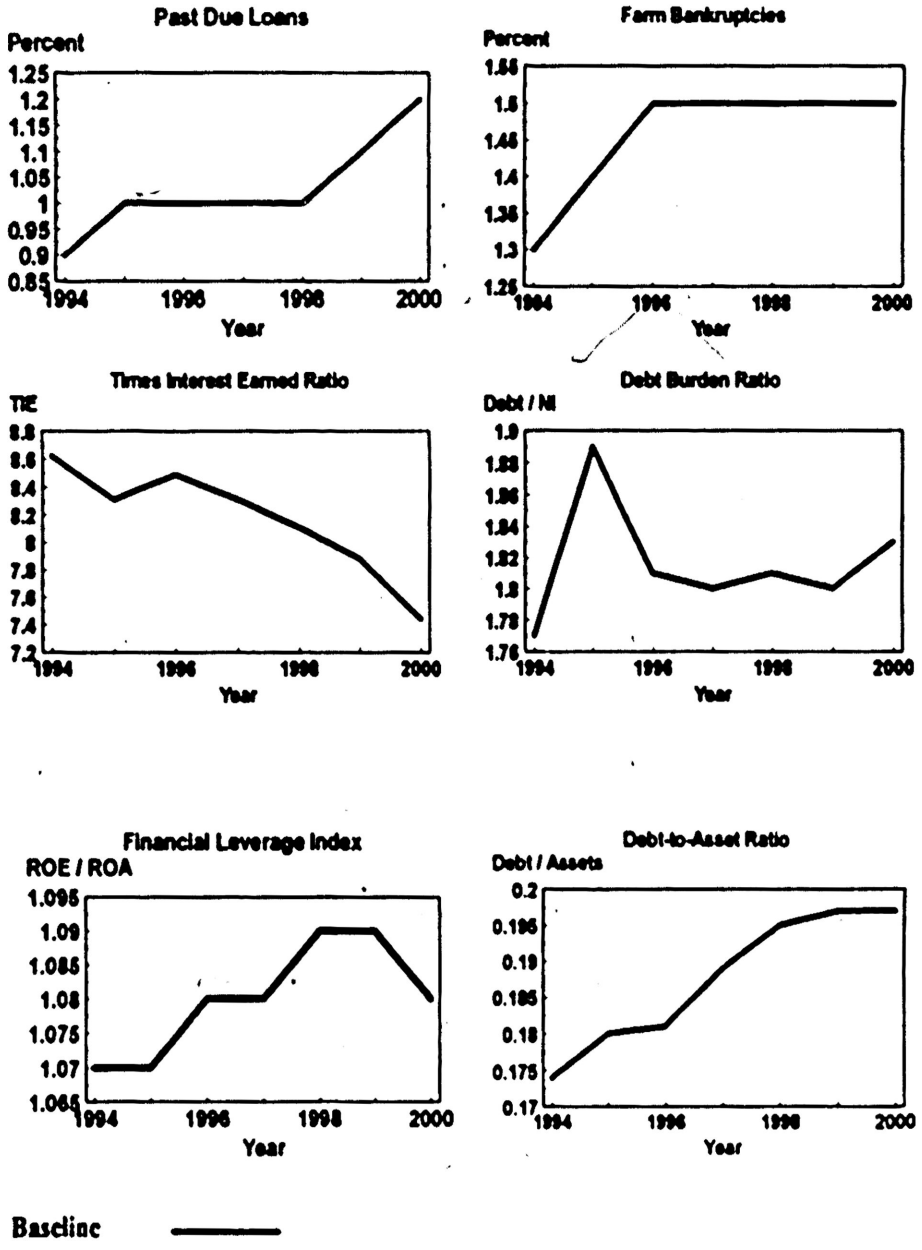
Baseline

Figure 4.5. Baseline Financial Stress Measures for the South Region

Financial Leverage Index. As discussed in Chapter II, the financial leverage index (FLI) indicates whether or not the use of debt was profitable. If the FLI is above one, farmers are earning a profit from their use of debt. However, if the FLI falls below one, it is questionable whether the use of debt represents an attempt at profit or survival. Since debt is projected to increase in all regions, FLI can only increase if net cash farm income also increases.

However, net cash farm income only increases in the West and South regions. Thus, the Plains, Northeast and Corn Belt have a decrease in their FLI. In all three of these regions, FLI is below one from 1994 to 2000. The Corn Belt has the lowest FLI of all regions by the year 2000 (0.85). Although the West's net income increases (10.96 percent), its 28.4 percent increase in interest expense causes FLI to fall slightly from 1.01 to 1. Thus, only the South region's FLI increases (1.07 to 1.08) from 1994 to 2000.

Times-Interest-Earned Ratio and Past Dues. Recall net cash farm income growth was negative in the Plains, Northeast and Corn Belt regions. Also, interest expense grew rapidly in these regions. Since the times-interest-earned (TIE) ratio is comprised solely of net cash farm income and farm interest expense, it is obvious that the above three regions will experience decreasing TIE ratios. Although the South and West regions experience income growth, rapidly increasing interest expense also causes these regions TIE ratios to fall. The increase in interest expense is caused by rising interest rates. Throughout the

projected time period, the South will have the highest TIE ratio (7.4 in the year 2000). The lowest TIE ratios are projected (in the year 2000) in the Plains (3.4) and Corn Belt (3.3) regions.

Past dues are a function of lagged past dues and the TIE ratio. Thus, the projected fall in TIE for all regions results in increased past dues in every region. Past dues are projected to increase from 1.7 percent to 2.1 percent by the year 2000 in the West region. This level is mild in comparison with the levels present in the 1980s (i.e., 6 percent in 1986).

The Plains region experiences the largest percentage increase (85 percent) in past dues, since it also experienced the largest percentage decrease (26 percent) in the TIE ratio. Both the Northeast and Corn Belt regions will experience approximately a 50 percent increase in past dues from 1994 to 2000. The South is expected to have the lowest levels of past dues during this time period (1.2 percent in the year 2000).

Debt Burden Ratio and Bankruptcies. The debt burden ratio (total farm debt/ net cash farm income) will increase if debt growth exceeds the growth in net cash farm income. Debt is projected to increase in all five regions. Since net cash farm income growth is negative in three regions (Plains, Northeast and Corn Belt), these regions' debt burden ratios will increase. The South region's debt burden ratio also increases slightly (1.77 to 1.83), because debt growth exceeds the growth in net cash farm income. The West region's debt burden ratio, despite

being lower from 1995 to 1999, will end where it began at 2.5.

Bankruptcies are a function of their own lag and the lag of the debt burden ratio. Thus, the Plains, Corn Belt and South regions' bankruptcies increase (26 percent, 13 percent, and 15 percent, respectively) due to the higher debt burden ratios. Bankruptcy rates fall 14 percent in the West region from 1994 to 2000. This region's debt burden ratio varied less than 3 percent during this time period.

The Northeast experiences a 32 percent decrease (from 3.1 to 2.1 percent) in bankruptcy even though the debt burden ratio increases 20 percent from 1994 to 2000. The reason for this anomaly is that bankruptcies fall the most (from 3.1 to 2.3 percent) from 1994 to 1995. This decrease occurs one year after the debt burden ratio falls 35 percent. Bankruptcies are unchanged from 1996 to 2000 as the debt burden ratio varies less than 8 percent from 1995 to 1999.

Discussion of Projections under CRP Continuation

This section starts by outlining the change from 1994 to 2000 in the five variables projected by AG-GEM under the CRP continuation scenario. An explanation is then given on how these variables affect the six measures of regional financial stress in relation to the baseline.

Major Farm Sector Variables

Total Farm Assets. Unlike the projected decrease in U.S farm asset values that occur in the baseline, asset values will increase if CRP is continued. Asset

values are higher than the baseline, because CRP land does not re-enter the market. U.S. farm asset values will increase $72.8 billion (8.3 percent) from 1994 to 2000 if CRP is continued. Asset values in all five regions grow mainly due to rising land values. The greatest increases from 1994 to 2000, occur in the West (12.72 percent) and South (11.51 percent) regions. The remaining regions (Plains, Northeast and Corn Belt) experience between a 5.15 to 6.72 percent growth in asset value.

Total Farm Debt and Interest Expense. If the CRP is continued, farmers will expand their use of debt by 11.6 percent ($16.25 billion) from 1994 to 2000. The largest percentage growth in debt will occur in the South (15.2 percent), West (13.4 percent) and Plains (11.73 percent) regions. Debt in the Northeast and Corn Belt regions increases 8.86 and 7.77 percent, respectively.

Increased debt levels result in higher interest expenses. As in the baseline, higher interest rates cause the percentage growth in interest expense to exceed the percentage increase in debt. Interest expense growth from 1994 to 2000 ranges from 28.49 percent in the Northeast to 43.98 percent in the Plains. The remaining regions' interest expenses increase between 30.95 percent (South) and 36 percent (Corn Belt).

Government Farm Program Costs. Overall, U.S. farm program costs are projected to increase 11.1 percent ($680 million) from 1994 to 2000. This is

$3.33 billion below the projected $4 billion increase in the baseline. The West region experiences an 18.4 percent ($151 million) decrease in government payments from 1994 to 2000. All of the remaining regions receive higher payments in the year 2000 than in 1994. The Corn Belt and South receive roughly 20 percent more (by the year 2000). The Plains and Northeast regions' government payments increase 10.74 and 13.84 percent, respectively.

Net Cash Farm Income. U.S. net cash farm income is projected to decrease approximately 1 percent ($500 million) from 1994 to 2000. As in the baseline scenario, farmers are caught in the price-cost squeeze of frozen target prices and increasing costs of production. The Plains, Northeast, and Corn Belt are expected to see decreases in net cash farm income of 13, 11.3, and 13.4 percent, respectively. The West and South's income are projected to increase 8.6 and 11.2 percent, respectively. These two regions fair better than the other three, because they derive proportionally less of their income from government payments which are shrinking in real terms.

Measures of Financial Performance

Debt-to-Asset Ratio. The debt-to-asset ratio changes very little in any region, because the overall growth rate in U.S. farm assets (8.3 percent) and farm debt (11.6 percent) are similar. The West and Corn Belt regions' leverage ratios are constant (0.16) from 1994 to 2000. The Plains and South regions' debt-to-

asset ratios increase slightly (from 0.17 to 0.18) in 1995 and then remain unchanged. The Northeast has the lowest leverage ratio throughout the projected time period (0.13 in the year 2000).

Financial Leverage Index. Since farm debt levels grew in every region, any region with negative income growth will have a falling financial leverage index. This occurs in the Plains, Northeast and Corn Belt regions, so their FLIs fall (10, 6 and 11 percent, respectively) from 1994 to 2000. The remaining regional (West and South) FLIs decrease, because their respective income growth rates (8.62 and 11.2 percent) are exceeded by their interest expense growth rates (31 and 32 percent). The Corn Belt is projected to have the lowest FLI (0.81 in the year 2000) from 1994 to 2000. Only the South will have an FLI above one (1.06) in the year 2000.

Times-Interest-Earned Ratio and Past Dues. The TIE ratio is projected to decrease in every region from 1994 to 2000 if CRP is continued. The Plains, Northeast and Corn Belt regional TIE ratio falls, because of falling net income and increasing interest expense from 1994 to 2000. The West and South regions' TIE ratios decrease, due to interest expense increasing roughly 31 percent, while net cash farm income only increases about 10 percent from 1994 to 2000. The lowest TIE ratios are projected (in the year 2000) in the Plains (3.15) and Corn Belt

(3.35) regions. The highest TIE ratio is always claimed by the South (7.43 in the year 2000).

Since the TIE ratios are projected to decrease in every region, past dues will increase in all regions from 1994 to 2000. The Plains region experiences the largest percentage increase (107 percent) in past dues, since it also has the largest percentage decrease (30 percent) in the TIE ratio. The South will have the lowest level of delinquencies (1.2 percent in the year 2000), because it had the highest TIE ratio from 1994 to 2000. The Corn Belt and Northeast regions' past dues increase 70 and 47 percent, respectively. Past dues in the West increase 24 percent (from 1.7 to 2.1 percent) from 1994 to 2000.

Debt Burden Ratio and Bankruptcies. The debt burden ratio increases in all regions from 1994 to 2000. The Plains, Northeast and Corn Belt regions' debt burden ratios increase (28, 23 and 25 percent; respectively), due to increased debt levels and negative growth in net cash farm income. The West and South's income growth rate (8.62 and 11.2 percent, respectively) is surpassed by their debt growth of 13.4 and 15.2 percent (from 1994 to 2000). Thus, both of these regions debt burden ratio increases approximately 4 percent from 1994 to 2000.

Bankruptcies are driven mainly over time by the lagged debt burden ratio. Bankruptcies increase in the Plains, Corn Belt and South (33.3, 25 and 15 percent, respectively) from 1994 to 2000, due to higher debt burden ratios. From 1994 to

2000, bankruptcies in the West and Northeast region decrease (9 and 13 percent, respectively) even though the debt burden ratio increases. The reason for this is the same as in the baseline scenario (i.e., the largest decrease in bankruptcy for these regions occurs in 1995, one year after a sharp decrease in the their debt burden ratios).

Comparing the Continuation of CRP to Baseline

In comparing measures of financial stress between continuing CRP and the baseline (CRP eliminated) scenario, one would expect to observe the largest differences in those regions with the most CRP acreage. Thus, one would expect significant differences between scenario projections for the West (23 percent of CRP acreage), Plains (41 percent of CRP acreage) and Corn Belt (15 percent of CRP acreage).

Figures in each of the following sections provide a graphical comparison between a continuation of CRP and the baseline for the six measures of financial stress used in this study. Tables (A1 - A5 in the appendix) provide data on annual levels, annual percentage change and percent deviation from baseline for all six measures of financial stress.

Impact on West Region

Under both scenarios, past dues (delinquencies) are projected to increase from 1.7 percent of farm borrowers to 2.1 percent by the year 2000 (Figure 4.6). The level of past dues, however, can be judged as mild by comparison with the 1980s experience. The times-interest-earned ratio falls approximately 13 percent (in both scenarios) from 1994 to 2000, suggesting a minor decline in debt service capacity. This occurs because the 30 percent growth in interest expense exceeds the eight percent increase in net cash farm income. Interest expense was higher due to higher interest rates and about a 12 percent increase in farm debt from 1994 to 2000 for both scenarios.

If CRP is continued, bankruptcies are projected to be 5 percent above baseline in the year 2000. Bankruptcies start to increase above baseline in 1998, one year after the debt burden ratio increases above baseline. The debt burden ratio is higher (from 1997 to 2000) if CRP is continued, due to higher debt levels and lower growth in net cash farm income.
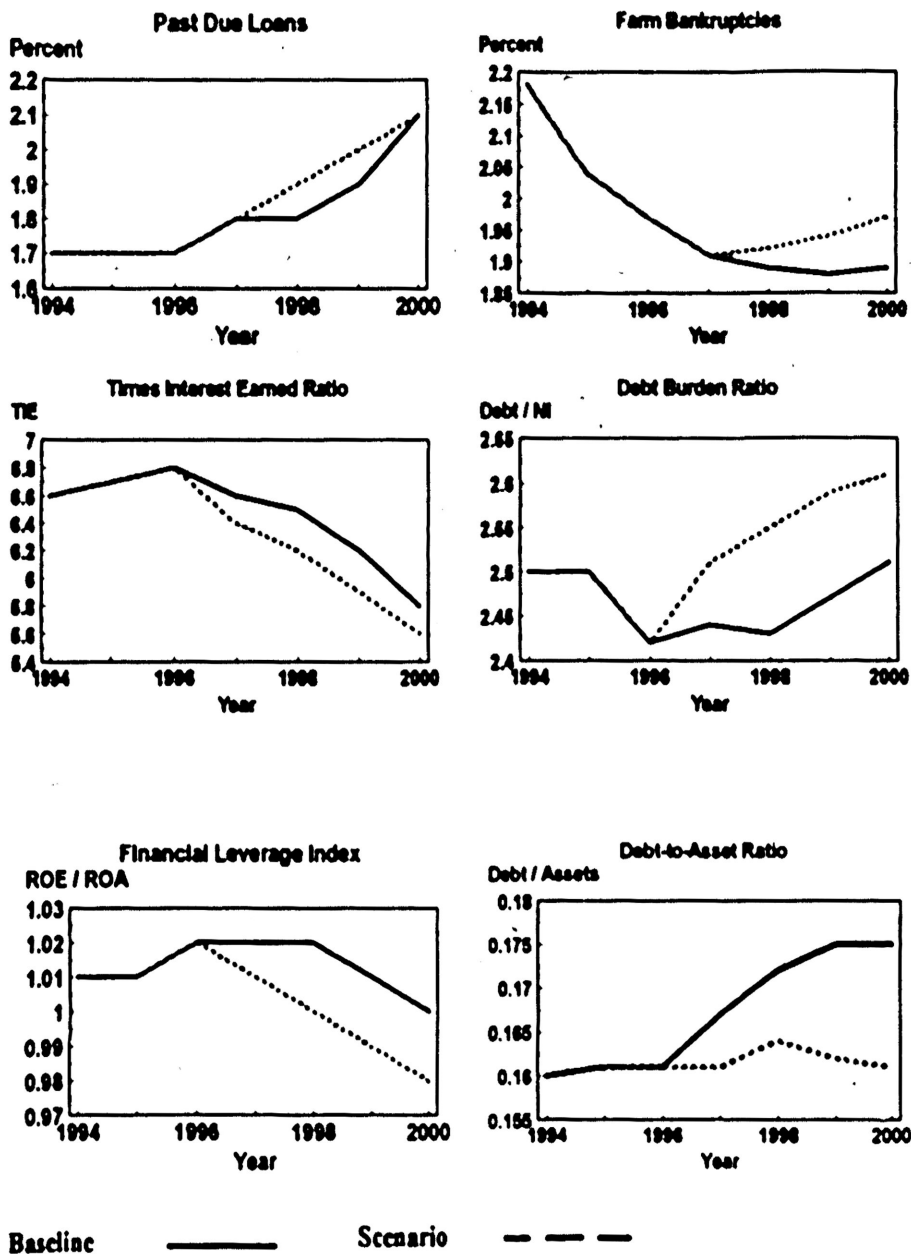
Figure 4.6. Comparing Continuing CRP to Baseline for the West Region

The hope of reducing budget outlays by eliminating CRP is unrealized as farm programs would cost $850 million more (from 1996 - 2000) if CRP is discontinued. Government costs are higher because the return of CRP land to production causes an increase in the supply of farm program crops. Increased supplies drive down farm program crop prices, causing deficiency payments to increase.

Farm asset values (especially land) are sensitive to the ultimate future of CRP. If CRP is continued, asset values are $20.8 billion (11 percent) over baseline levels from 1996 to 2000. Since farm debt differs by only 2 percent between the two scenarios, the higher projected asset values under the CRP continuation scenario result in the debt-to-asset ratio being 13 percent below baseline by the year 2000. The financial leverage index is 2 percent below baseline (0.98 versus 1) by the year 2000. This occurs because the CRP continuation scenario experiences slightly less income (and slightly more interest expense) growth than the baseline.

Impact on Plains Region

Bankruptcies increase 33 percent from 1994 to 2000 and are consistent with baseline projections (Figure 4.7). The debt burden ratio increases 28 percent, due to a $4.1 billion increase in debt and a $1.3 billion decrease in net income. Past
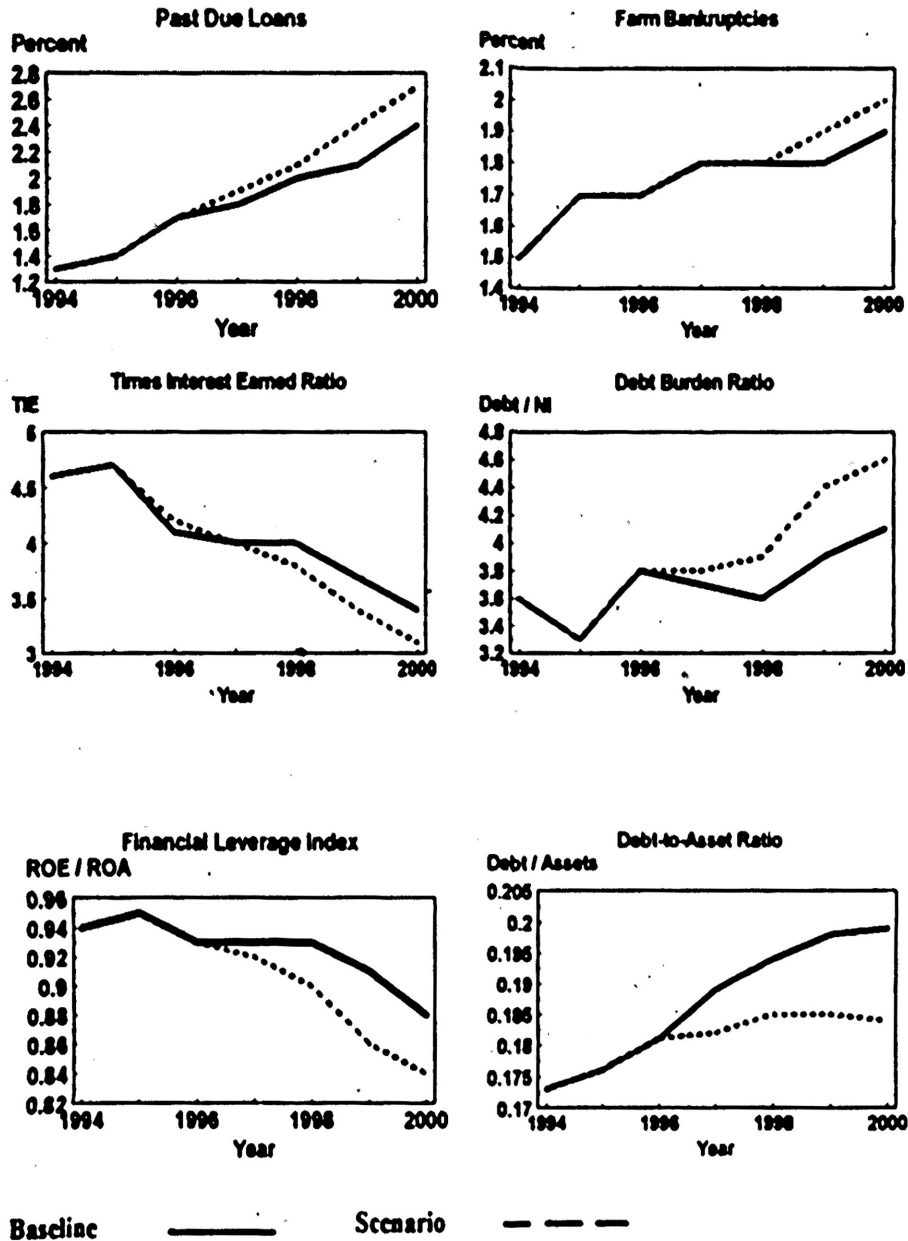
Figure 4.7. Comparing Continuing CRP to Baseline for the Plains Region

dues are projected to double (1.3 to 2.7 percent) and be 12.5 percent above baseline in the year 2000. Increased delinquencies are traceable to a 30 (20 percent in baseline) percent decline in the TIE ratio. This ratio falls because net cash farm income declines $1.26 billion if CRP is continued while interest expenses increase $1.2 billion.

Total farm program payments are $4 billion below baseline (from 1994 to 2000) if CRP is continued. Farm asset values are $20 billion (11 percent) above baseline values by the year 2000. Since debt growth differs by less than 3 percent between the two scenarios, the higher projected asset values under the CRP continuation scenario result in the debt-to-asset ratio being 10 percent below baseline by the year 2000. As in the West, the FLI is slightly less (0.84 versus 0.88) by the year 2000 if CRP is continued. This is again due to lower projected income and higher projected interest expense than exists in the baseline.

Impact on Northeast Region

Past dues increase in both scenarios by 47 percent from 1994 to 2000 (Figure 4.8). This increase is due to the TIE ratio falling 25 percent regardless of CRP's fate. As in the Plains, the TIE ratio falls because of decreasing net cash farm income and higher interest expenses. Interest expenses increase $480 million ($432 million in baseline) from 1994 to 2000, because of higher interest rates and increased farm debt levels.
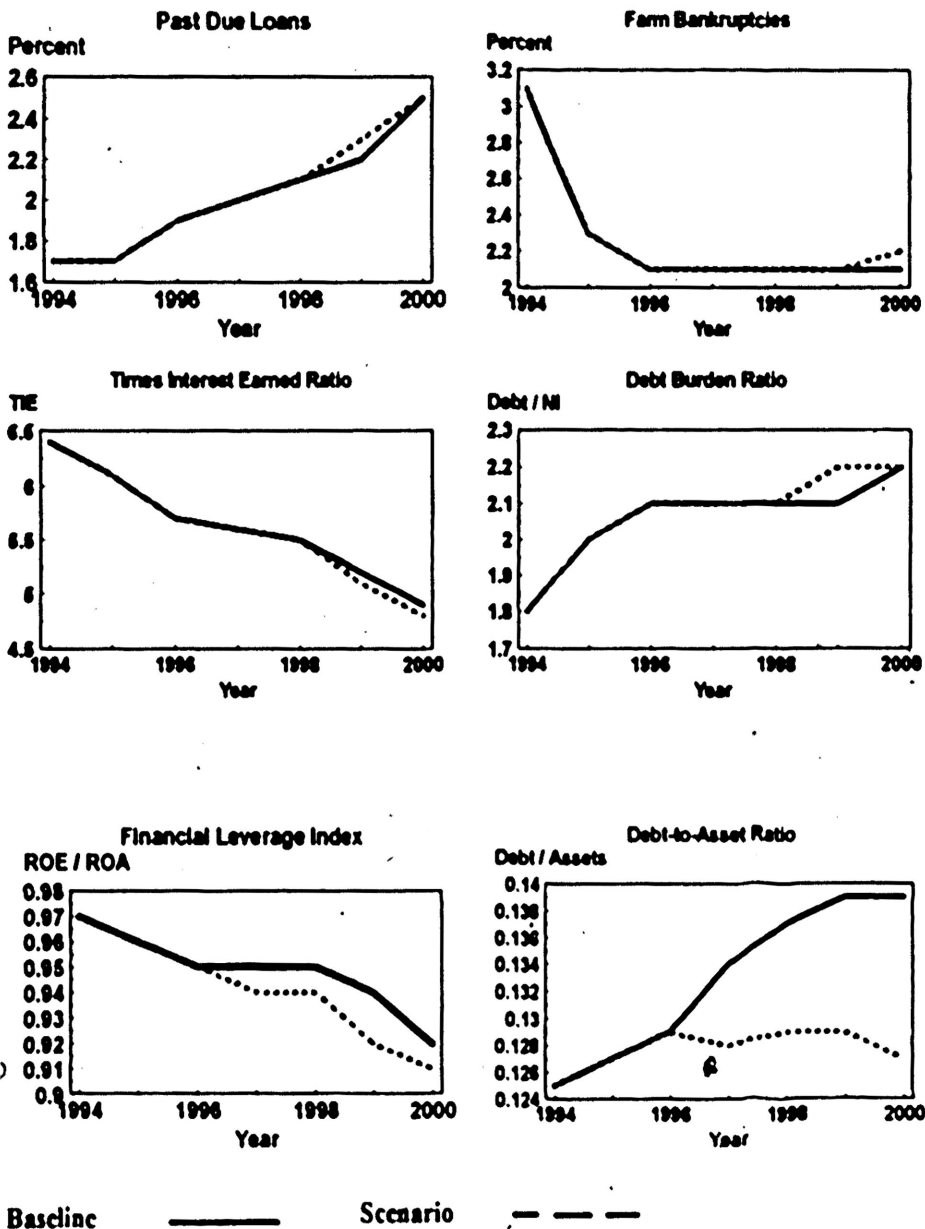
Figure 4.8. Comparing Continuing CRP to Baseline for the Northeast Region

After a 32 percent decline in farm bankruptcies from 1994 to 1996, bankruptcies are almost constant (both scenarios) for the remainder of the decade. The debt burden ratio increases 23 percent in both scenarios from 1994 to 2000. This ratio increases due to an 11 percent decrease (both scenarios) in net cash farm income and a 9 (6.4 for baseline) percent increase in farm debt. (Recall the reason why bankruptcies decrease when the debt burden ratio increases in the Northeast. This explanation is provided in the Baseline Projections: Debt Burden Ratio and Bankruptcy section.)

From 1994 to 2000, total farm program costs are $1.2 billion below the baseline if the Conservation Reserve Program is continued. The debt-to-asset ratio and FLI are lower than baseline for the same reasons given in the Plains section.

Impact on Corn Belt Region

Past due loan levels are projected to increase from 1.0 to 1.7 (1.5 percent in baseline) percent from 1994 to 2000 (Figure 4.9). Past due loan levels are 13 percent above baseline by the year 2000. Past dues increase, because the times-interest-earned ratio falls 27 percent (23 percent in baseline) from 1994 to 2000. The TIE ratio falls, because net cash farm income falls 13.4 percent (6 percent in baseline) and interest expense increases 36 percent (33 percent in baseline) from 1994 to 2000.

Past Due Loans

Percent

Farm Bankruptcies

Percent

Times Interest Earned Ratio

TIE

Debt Burden Ratio

Debt / NI

Financial Leverage Index

ROE / ROA

Debt-to-Asset Ratio

Debt / Assets

Baseline ———— Scenario · — — —
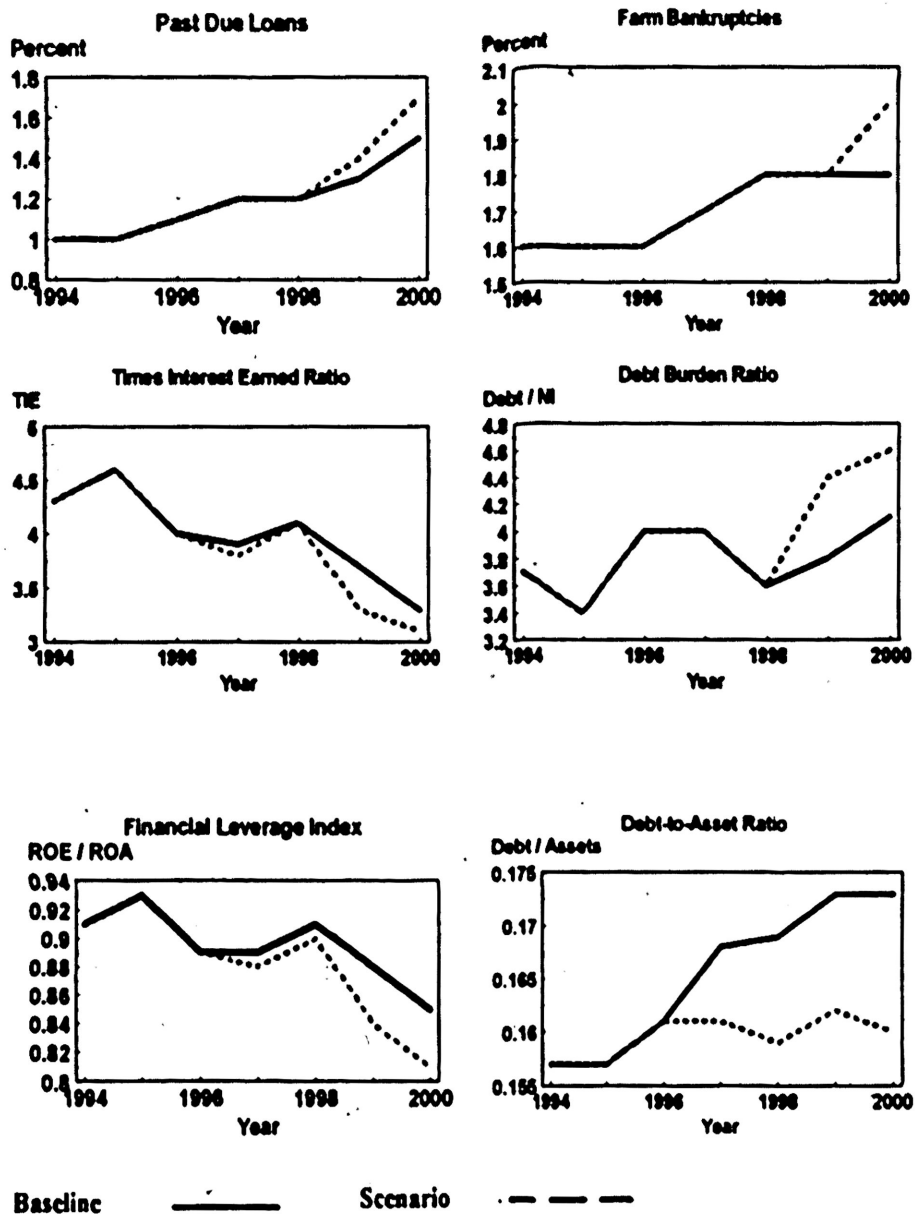
Figure 4.9. Comparing Continuing CRP to Baseline for the Corn Belt Region

Net cash farm income falls, despite a total of $15.1 billion ($18.25 billion for baseline) in farm program payments during this time period. From 1996 to 2000, total farm program costs are $3.13 billion (30 percent) less if CRP is continued. If CRP is eliminated, direct government payments account for 40 percent of farmers' net cash farm income from 1998 to 2000.

Bankruptcies are forecasted to be 10 percent (2.0 versus 1.8) above baseline by the year 2000. This is caused by the debt burden ratio increasing 16 percent above baseline in 1999. As in the previous regions, debt is projected to vary less than 3 percent between scenarios. Thus, the debt-to-asset ratio is 6 percent below baseline in the year 2000, because farm asset values are 10 percent above baseline. The Corn Belt's financial leverage index is projected to be the lowest of all regions by the year 2000. It is expected to decrease 11 percent (from 0.91 to 0.81) if CRP is continued and decline 7 percent (from 0.91 to 0.84) in the baseline scenario.

Impact on South Region

The South region is projected to have the lowest levels of past dues and bankruptcies in the U.S. (Figure 4.10). This is expected since the South has the strongest TIE and debt burden ratios in the nation. Delinquencies increase 33 percent from 1994 to 2000 for both scenarios. Bankruptcies increase 15 percent from 1994 to 1996 and then remain unchanged, regardless of the CRP's fate.
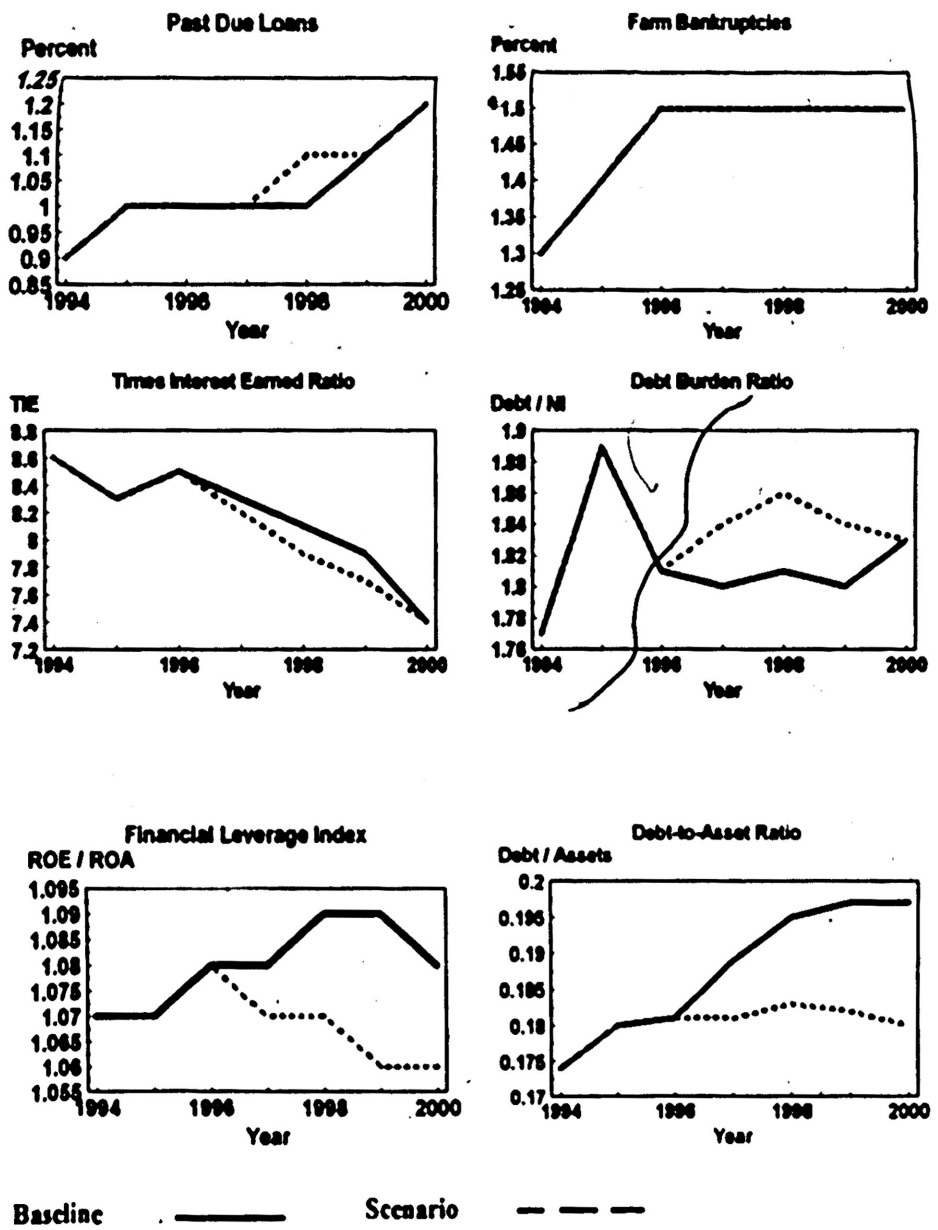
Figure 4.10. Comparing Continuing CRP to Baseline for the South Region

Although the TIE ratio falls 12 percent (under both scenarios), its level (7.4) in the year 2000 is still the highest of all regions. In fact, it is over twice the level of 3.15 found in the Plains and Corn Belt regions.

Annual farm program payments average $1 billion under both scenarios, but account for only 6 percent of the region's net cash farm income. If CRP is continued, farm asset values will be $20 billion (12 percent) above baseline by the year 2000. Since the variation in debt between scenarios is less than 3 percent, the debt-to-asset ratio is 10 percent below baseline by the year 2000. FLI is below baseline (1.08 versus 1.06) for the same reasons mentioned in previous sections.

Discussion of a Ten Percent Reduction in Target Prices

In an attempt to reduce farm program costs, the 1990 Farm Bill froze target prices at their 1990 level for all farm program crops. This freeze effectively reduced farmers returns from farm program participation, because inflation decreased the amount of deficiency payments in real terms. In 1995, Congress again seeks to reduce its financial commitment to agriculture.

One of the budget cutting measures currently being considered by Congress is reducing target prices in the 1995 Farm Bill. Thus, this section analyzes the regional financial stress impacts from a 10 percent reduction in target prices (in addition to eliminating the Conservation Reserve Program). Since farmers

deficiency payments will be reduced if target prices are cut, it is expected that this scenario will yield a higher level of financial stress than the baseline.

<div align="center">

Discussion of Projections under Reduced Target Prices

</div>

Major Farm Sector Variables

Total Farm Assets. As in the baseline, U.S. farm asset values fall mainly due to CRP land coming back on the market when the CRP is eliminated. U.S. farm asset values fall 3.7 percent ($32.6 billion) from 1994-2000 if target prices are reduced 10 percent. The decrease in value ranges from -0.67 percent (South) to -8.0 percent (Corn Belt) from 1994 to 2000. The West region records the only growth in asset values of 1.46 percent. However, this is due to asset growth that occurs before CRP is eliminated. The West's assets increase 5.42 percent (1994 to 1996), before falling 3.78 percent (1997 to 2000).

Total Farm Debt and Interest Expense. U.S. farm debt will increase 6.7 percent ($9.37 billion) from 1994 to 2000. As in the baseline, this is expected as farmers borrow to bring CRP land back into production. Debt growth ranges from 2 percent (Corn Belt) to 10.1 percent (South) over the six year period. The West, Plains and Northeast debt levels increase 8.83, 7.33, and 3.93 percent, respectively.

Farmers' interest expense increases 29.1 percent ($3.2 billion) from 1994 to

2000, due to the increases in farm debt and higher interest rates. Farmers in the Plains will experience the largest growth in interest expense (38.3 percent) from 1994 to 2000. The other regions' interest expense increases between 22.7 (Northeast) and 28.7 percent (Corn Belt).

Government Farm Program Costs. Deficiency payments are based on the difference between target price and market price (and then multiplied by eligible production). In the present scenario, when CRP land comes back into production it drives down market price causing deficiency payments to increase. On the other hand, reducing target prices decreases deficiency payments.

The net result of these opposing forces is farm program costs decrease 1.6 percent ($990 million) from 1994 to 2000. Government payments to farmers decrease the most in the West (35.4 percent) and South (39 percent) regions. Farmers in the Plains and Corn Belt will see their program payments decrease 5.2 and 24.4 percent, respectively. Only farmers in the Northeast will see their payments increase $133 million (20.3 percent) from 1994 to 2000.

Net Cash Farm Income. Of all the scenarios analyzed in this study, U.S. farmers income is the lowest if target prices are cut. Farmers are hurt by reduced farm payments, lower market prices for their crops and the higher production costs brought on by inflation. These factors cause U.S. net cash farm income to fall 6.9

percent ($3.79 billion) from 1994 to 2000. Net income is projected to fall the most in the Corn Belt (30.2 percent). The Plains (-22.5 percent) and Northeast (-15.8 percent) also have a decrease in net income over time. The West (8.4 percent) and South (7.6 percent) are the only regions with income growth from 1994 to 2000.

Measures of Financial Performance

Debt-to-Asset Ratio. The debt-to-asset ratio increases in every region from 1994 to 2000 if target prices are cut. This occurs because farm debt increases in every region and asset values decrease in every region, except the West. The West's debt-to-asset ratio increases (from 0.16 to 0.17), because the 8.8 percent increase in debt outweighs the 1.46 percent growth in assets from 1994 to 2000.

In the year 2000, the highest leverage ratios are in the Plains (0.2) and South (0.19) regions. The Northeast region has the lowest projected beginning (0.12) and ending (0.14) debt-to-asset ratio. The Corn Belt's leverage ratio increases from 0.16 to 0.17 from 1994 to 2000.

Financial Leverage Index. Since debt is projected to increase in every region, FLI will decrease in those regions where net cash farm income falls. Thus, the financial leverage index in the Plains, Northeast and Corn Belt regions falls from 1994 to 2000. In all three of these regions, FLI is below one from

1994 to 2000. The Corn Belt has the lowest FLI of all regions from 1994 to 2000 (0.78 in 2000). Although the West's net cash farm income increases (8.4 percent), its 25.7 percent increase in interest expense causes FLI to fall slightly from 1.01 to 1.0. The South's FLI begins and ends at 1.07, despite increasing (and then decreasing) 6 percent from 1997 to 2000.

Times-Interest-Earned Ratio and Past Dues. The times-interest-earned ratio falls in every region from 1994 to 2000. The TIE ratios in the Plains, Northeast and Corn Belt fall, due to increased interest expense and decreased net cash farm income. Although the South and West regions experience income growth, rapidly increasing interest expense also causes these regions' TIE ratios to fall. From 1994 to 2000, the South will have the highest TIE ratio (7.5 in the year 2000). The lowest TIE ratios are projected (in the year 2000) in the Plains (2.99) and Corn Belt (2.8) regions.

The projected fall in the TIE ratio for all regions results in past dues increasing in every region. The largest percentage increases in past dues will occur in the Plains (123 percent) and Corn Belt (110 percent). These regions also have the greatest projected decrease (35 percent) in their TIE ratios. Past dues in the West and Northeast will increase from 1.7 percent of farm borrowers in 1994 to 2.1 (2.6 in Northeast) percent of borrowers in the year 2000. The South is projected to have the lowest levels of past dues during this time period (1.2

percent in the year 2000).

Debt Burden Ratio and Bankruptcies. The Plains, Northeast and Corn Belt regions will experience significant increases in their debt burden ratios. These regions debt burden ratios increase 38.5, 23.5 and 46.1 percent, respectively. Debt burden ratios increase in these regions, due to higher debt levels and negative growth in net cash farm income. The South region's debt burden ratio increases from 1.77 to 1.81 from 1994 to 2000. The West region's debt burden ratio begins and ends at approximately 2.5 and varies less than 2.5 percent from 1994 to 2000.

Since the debt burden ratio in the West is not robust over time, projected bankruptcies for the West are unchanged (1.9 percent of farmers) from 1997 to 2000. Increased debt burden ratios in the Plains, Corn Belt and South result in bankruptcies increasing 33, 44, and 15 percent, respectively. Bankruptcies in the Northeast fall from 3.1 to 2.2 percent of farmers.

Comparing a Ten Percent Decrease in Target Prices to Baseline

The difference between both scenarios' measures of financial stress is expected to be the largest in those regions with the largest production of farm program crops (i.e. Corn Belt and Plains regions). Figures in each of the following sections provide a graphical comparison between a ten percent reduction in the target prices and the baseline for the six measures of financial stress used

in this study. Tables (A6 - A10 in the appendix) provide data on annual levels, annual percentage change and percent deviation from baseline for all six measures of financial stress.

Impact on West Region

Past dues rise 23 percent for both scenarios from 1994 to 2000 (Figure 4.11). This decrease is fueled by a 12 percent decrease in the times-interest-earned ratio. The TIE ratio falls, due to interest expense growing 26 percent (28 percent in baseline) while net cash farm income only increases 8.4 percent (10.96 percent in baseline) from 1994 to 2000.

Bankruptcies decrease from 2.2 to 1.9 percent of farmers and are 1.5 percent above baseline in the year 2000. The debt burden ratio tends to remain at approximately 2.5 for both scenarios. This occurs because debt and income growth rates are within 3 percent of each other under both scenarios. Farm asset values are 0.3 percent below baseline in the year 2000. Asset values are lower because net cash farm income growth is 2.6 percent below baseline when target prices are cut. Thus, the debt-to-asset ratio is 1.8 percent below baseline in the year 2000. The financial leverage index falls from 1.01 to 1.0 in both scenarios.

Impact on Plains Region

If target prices are cut, the Plains region will experience the most rapid
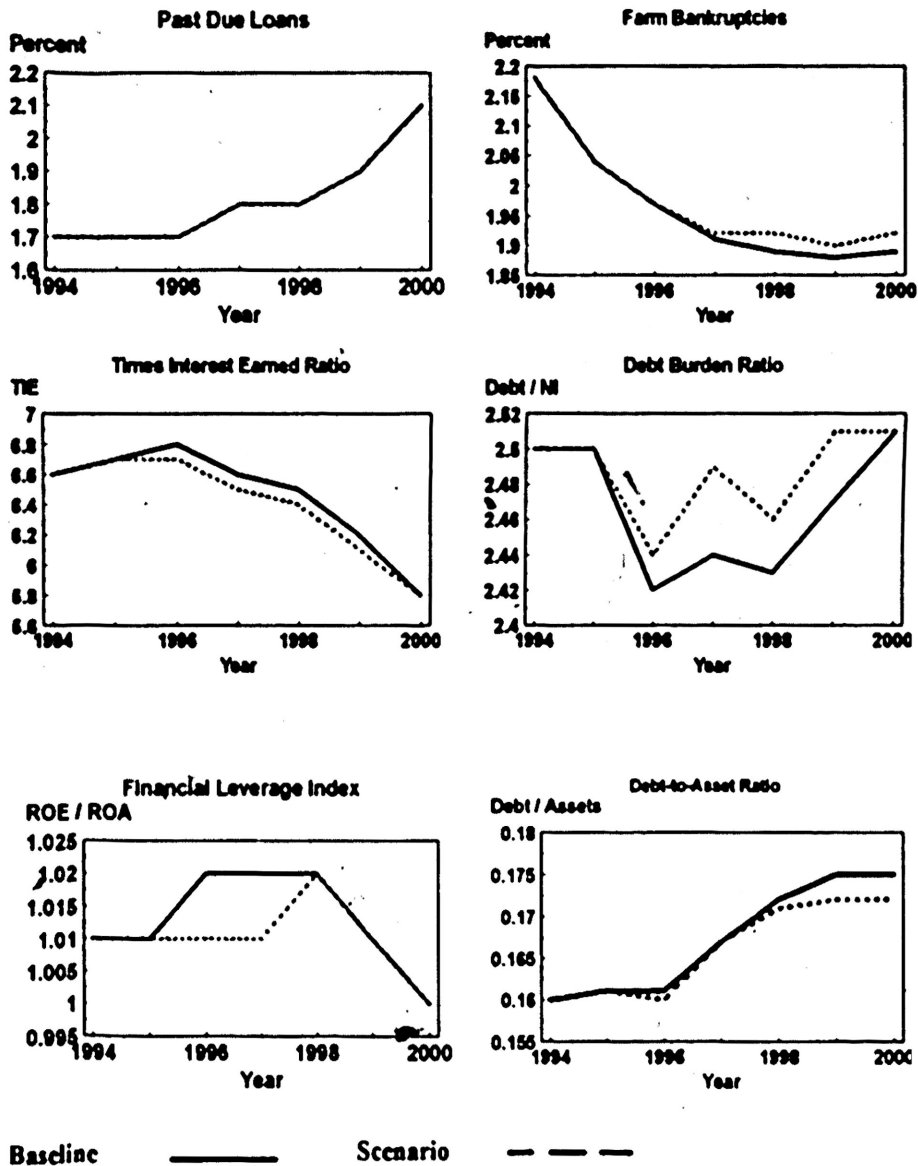
Figure 4.11 Comparing a Ten Percent Reduction in
the Target Price to Baseline for the West Region

increase in past dues and have the highest level of delinquencies by the year 2000. Delinquencies increase 123 percent over the projected time period and are 20 percent above baseline by the year 2000 (Figure 4.12). Past dues increase, because a 10 percent cut in target prices significantly effects farmers profitability. Net cash farm income is expected to be 18.4 percent ($1.7 billion) below baseline if target prices are cut 10 percent.

Bankruptcies increase 33 percent (from 1.5 to 2 percent of farmers) and are 9.4 percent above baseline in the year 2000. Bankruptcies increase because the debt burden ratio increases 38 percent and is 20 percent above baseline in the final year. The debt burden ratio is above baseline, because net cash farm income is 18.4 percent below baseline (in the year 2000) while debt levels are within 2 percent.

In the year 2000, farm program payments account for 29 percent (43 percent under baseline) of farmers net cash farm income. The debt-to-asset ratio varies less than one percent from baseline, because debt and asset values vary less than two percent between scenarios. The FLI is 5.8 percent below baseline (in the year 2000), due to net cash farm income being 18.4 percent less than baseline.

Impact on Northeast Region

Past dues increase 53 percent (from 1.7 to 2.6 percent of farmers) and are 4.2 percent above baseline in the year 2000 (Figure 4.13). The TIE ratio falls 27
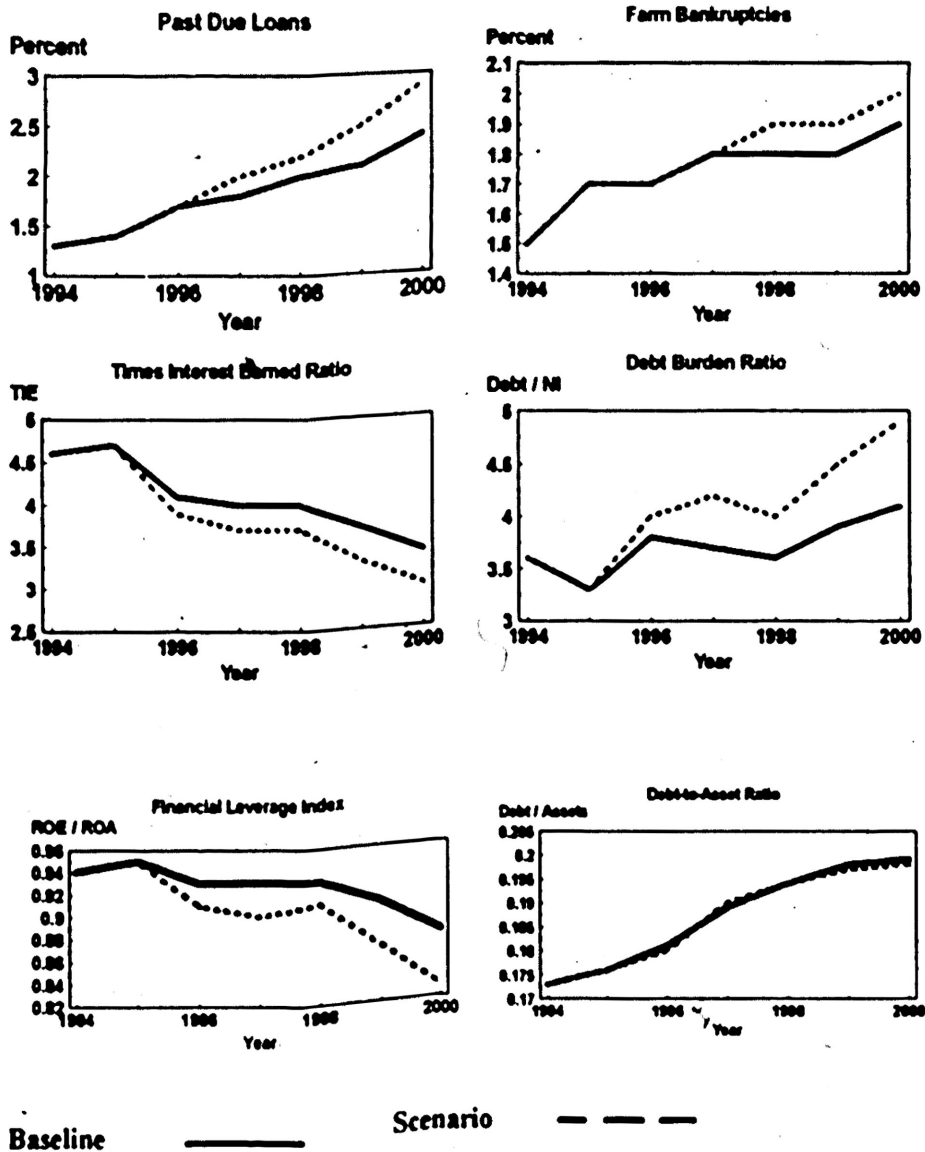
Figure 4.12. Comparing a Ten Percent Reduction in the Target Price to Baseline for the Plains Region

percent (from 6.4 to 4.7) and is roughly 2 percent below baseline from 1997 to 2000. The TIE ratio falls due to negative income growth and higher interest expenses in both scenarios. Bankruptcies fall 29 percent (3.1 to 2.2 percent of farmers) and are 5.5 percent above baseline at the end of this century.

The debt burden ratio increases 24 percent and is roughly 3 percent above baseline from 1998 to 2000. This ratio increases because net cash farm income declines 15.8 (11.1 in baseline) percent while farm debt grows 3.9 (6.4 in baseline) percent from 1994 to 2000. The debt-to-asset ratio is the lowest of all regions from 1994 to 2000. Both scenarios leverage ratios increase from 0.12 to 0.14, due to increased debt levels and lower farm asset values. The FLI falls from 0.97 to 0.91 and is one percent below baseline in the year 2000.

Farm program costs will be a total of $1.88 billion below baseline from 1994 to 2000 if target prices are cut ten percent. However, this budget savings almost perfectly matches the amount ($1.6 billion) that total net cash farm income will be below baseline for this time period. Thus, government budget cuts will come at the direct expense of farmers' bottom line.

Impact on Corn Belt Region

Delinquencies increase 110 percent (from 1.0 to 2.1 percent of farmers) by the year 2000, at which time they are 40 percent above baseline (Figure 4.14). Bankruptcies grow 44 percent and are 28 percent higher than the baseline at the
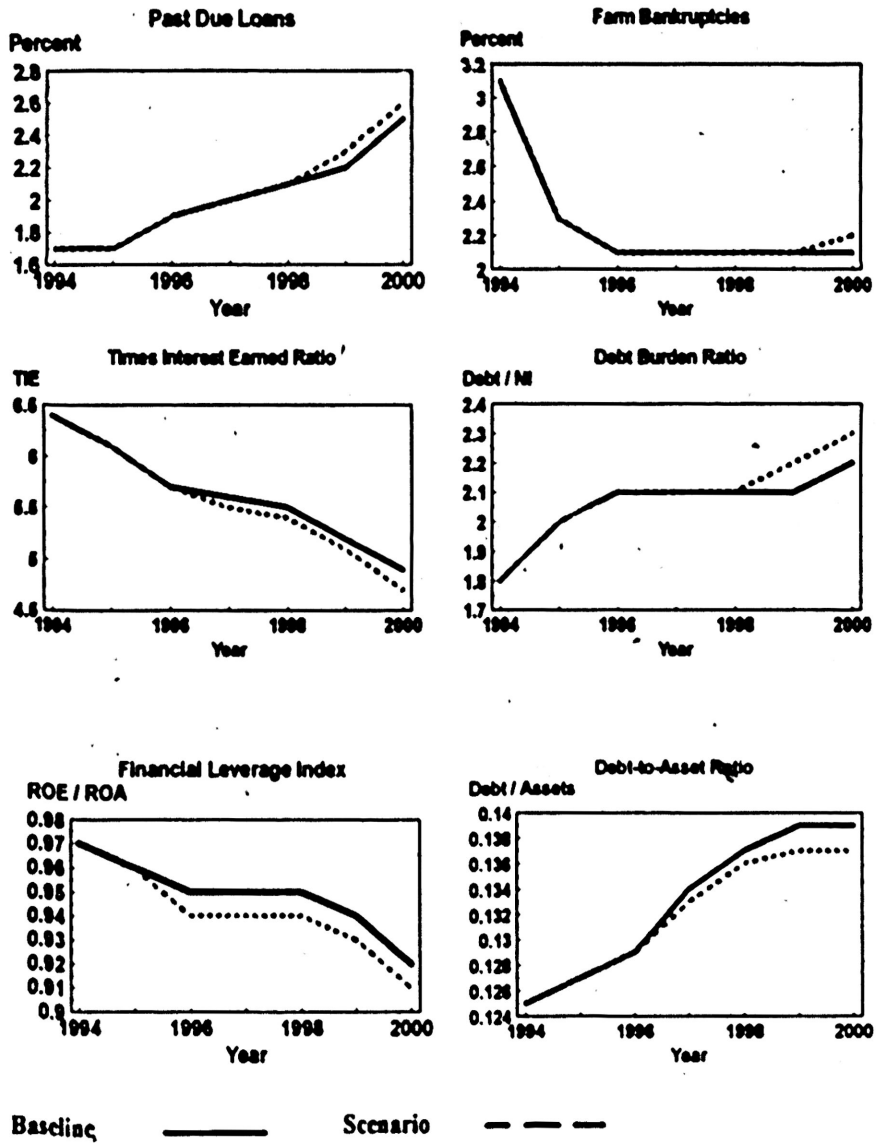
Figure 4.13. Comparing a Ten Percent Reduction in
the Target Price to Baseline for the Northeast Region

turn of the century. The TIE ratio and FLI ratio are the lowest in the nation (both scenarios). The TIE ratio decreases 36 percent (from 4.31 to 2.8) and is 15 percent below the baseline in the year 2000. The TIE ratio falls, because net cash farm income declines 30 (6 in baseline) percent while interest expense increases 29.(33 in baseline) percent.

The FLI decreases 14 percent (0.91 to 0.78) and is 8 percent below the baseline. The debt burden ratio is the highest of all the U.S. regions. It increased 46 percent (from 3.66 to 5.35) and is 30 percent above baseline in the year 2000. Debt growth varies less than 3.5 percent between scenarios, so a higher debt burden ratio (when target prices are cut) is mainly the result of net cash farm income being 25 percent below baseline.

Total farm program costs are $6.4 billion below baseline from 1994 to 2000 if target prices are cut. However, this budget savings again translates into an equivalent decrease in net cash farm income ($6.17 billion) from 1994 to 2000. From 1999 to 2000, farmers receive an average of 19 percent (41 percent for baseline) of their net cash farm income from the government.

Impact on South Region

The South region is projected to have the least financial stress of all regions. Past dues levels are forecasted to be the lowest in the nation. Under both scenarios, delinquencies are projected to increase from 0.9 to 1.2 percent of farm
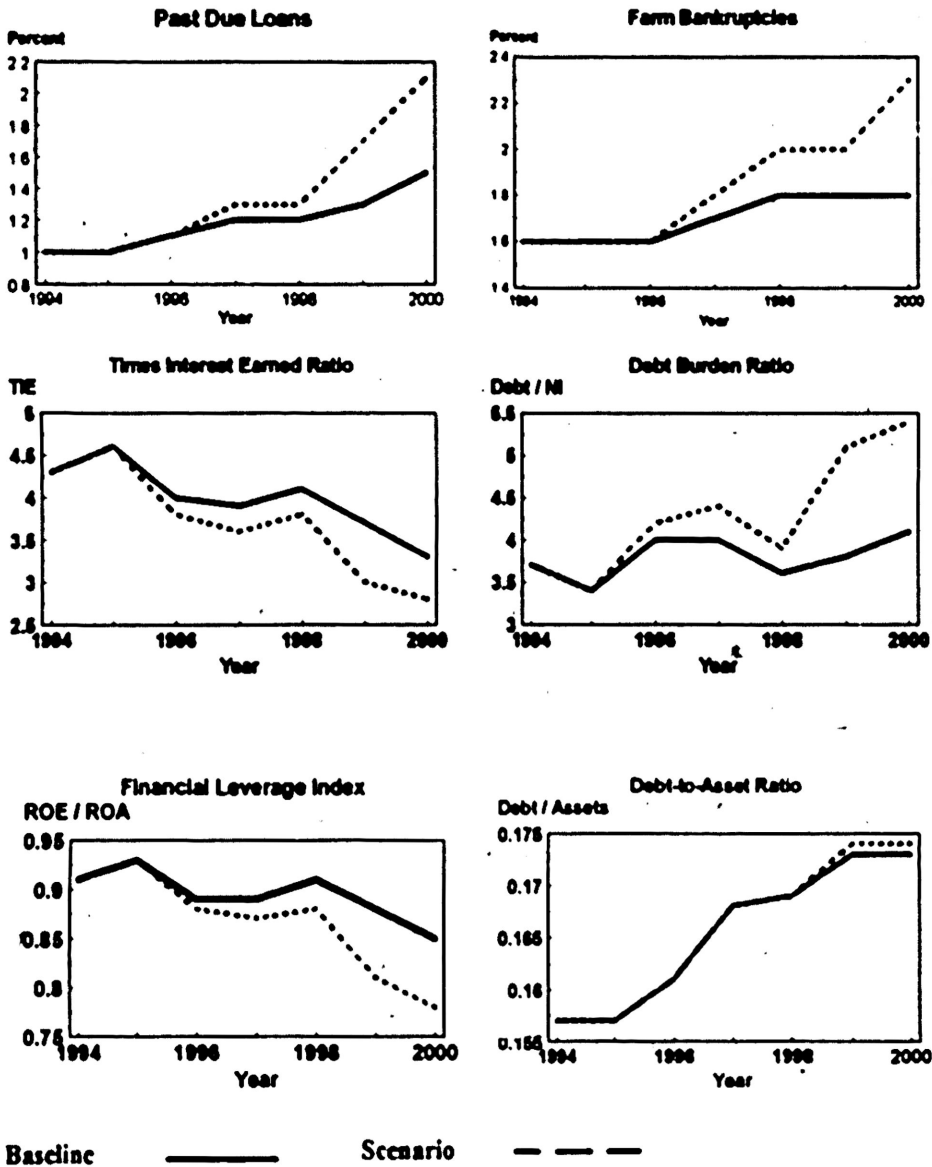
Figure 4.14. Comparing a Ten Percent Reduction in
the Target Price to Baseline for the Corn Belt Region

borrowers (Figure 4.15). The TIE ratio should fall 13 percent (from 8.6 to 7.5) by the year 2000 and never vary more than 1.1 percent from the baseline. The times-interest-earned ratio declines, because the growth in interest expense (28.7 percent) exceeds the increase in net cash farm income of 7.6 percent. The South's TIE ratio will always be the highest in the U.S. and over twice the level in the Plains (2.99) and Corn Belt (2.8) regions in the year 2000.

Bankruptcies will increase 15 percent and be 2 percent above baseline in the year 2000. The debt burden ratio increases slightly from 1.77 to 1.81 (1.83 in baseline), but is always the lowest in the nation. The FLI begins and ends at 1.07 and is always within one percent of baseline. The consistency of the South's FLI is the result of having growth rates in net cash farm income (7.6 percent) and debt (10.1 percent) that only differ by 2.5 percent. The debt-to-asset ratio increases from 0.174 to 0.193 and is two percent below the baseline. The leverage ratio increases, due to the increase in debt and the fall in asset values.

Discussion of a Two Percent Reduction in the Growth Rate of the Money Supply

This section discusses the regional impacts resulting from a two percent slower growth rate in the money supply (in addition to the elimination of CRP). Slower money growth reduces the availability of loanable funds and causes interest rates to increase. Thus, slower money growth results in farmers incurring
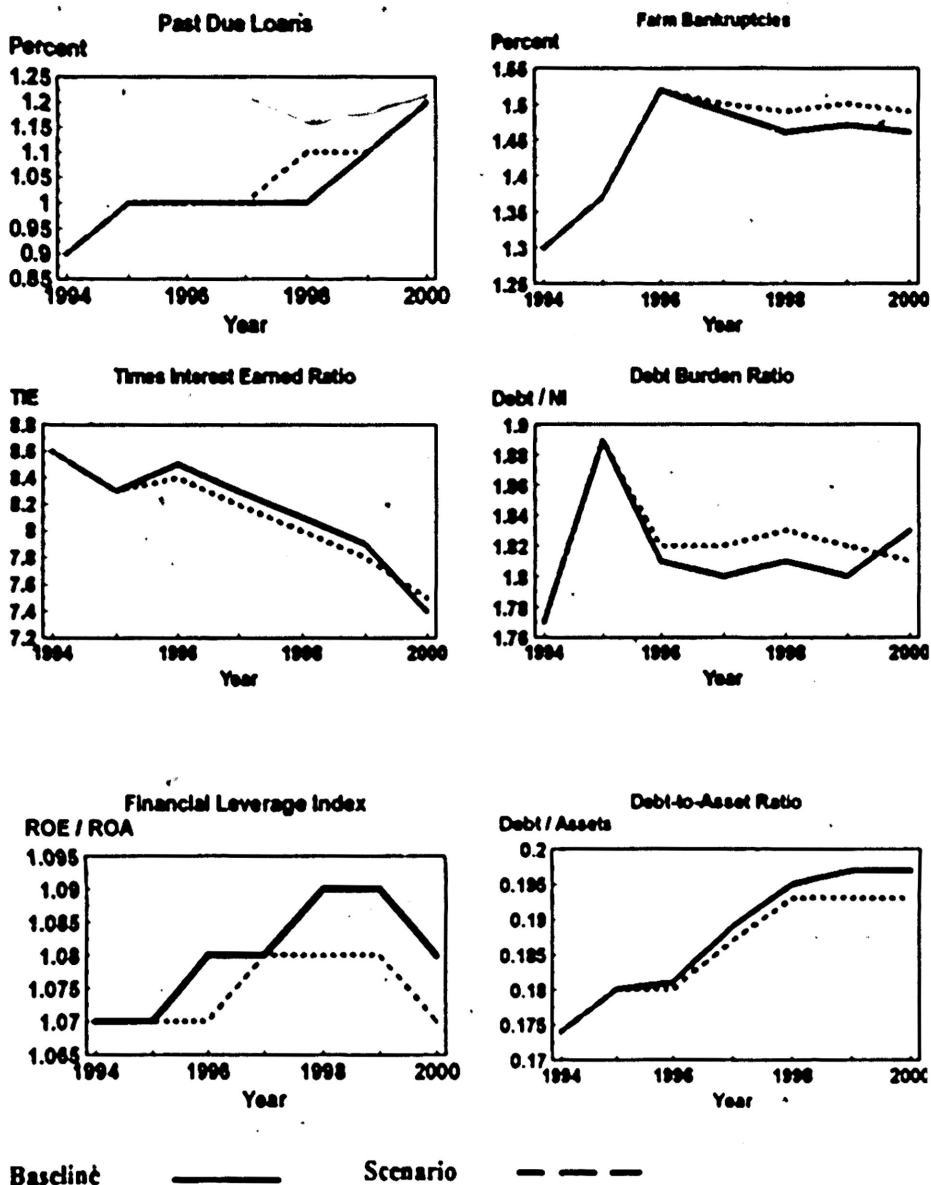
Figure 4.15. Comparing a Ten Percent Reduction in
the Target Price to Baseline for the South Region

higher interest expenses on existing loans and increased difficulty in borrowing new funds.

The value of the United States' dollar increases under this scenario. A stronger dollar makes U.S. agricultural exports more expensive to importing countries, so less is exported. U.S. crop producers are heavily dependent on exports. Thus, they are hurt by a decrease in agricultural exports, because it causes lower domestic crop prices. This causes higher farm program costs, because of higher deficiency payments. U.S. livestock producers will benefit from lower feed costs, but will be hurt by increased interest expense.

Discussion of Projections under Reduced Money Supply Growth

Major Farm Sector Variables

Total Farm Assets. The value of U.S. farm assets fall 3.4 percent ($30 billion) from 1994 to 2000 if the growth rate in the money supply is reduced by two percent a year. This decrease is largely due to the return of CRP land to production. In addition, higher interest rates decrease farmers' profit. This decreases the demand for farm land which lowers land (and farm equipment) values.

The value of farm assets in all but the West region are projected to decrease from 1994 to 2000. The decrease ranges from 0.49 percent in the South to a 7.12 percent drop in the Corn Belt. The Plains and Northeast regions lose 6.42 and

4.72 percent of their asset values, respectively. The West region's asset values increase 5.3 percent from 1994 to 1996. However, when CRP land comes back into production (starting in 1997), the West's asset values fall 3.6 percent from 1996 to 2000. Overall, the West experiences a 1.68 percent growth in asset value from 1994 to 2000.

Total Farm Debt and Interest Expense. Farmers' total debt increases 7.8 percent ($10.9 billion) from 1994 to 2000 if money growth is slowed. All regions increase their debt levels. Debt growth ranges from 4.26 percent in the Corn Belt to 11.01 percent in the South. The other regions' (West, Plains, and Northeast) debt increases 9.7, 7.94, and 4.73 percent, respectively. Debt growth is expected, due to the real estate transfers and capital expenditures that will occur when CRP land comes back into production.

Interest expense's growth rate is higher than debt's growth rate, due to higher interest rates. Interest expense is projected to increase over 50 percent in the Plains (58.27 percent) and Corn Belt (52.16 percent) from 1994 to 2000. The remaining regions all have projected increases between 39 74 (Northeast) and 44.37 (South) percent.

Government Farm Program Costs. Farm program costs increase 30 percent ($1.9 billion) from 1994 to 2000. As in the baseline, government costs increase

due to higher deficiency payments that result from lower market prices for farm program crops. Farm program costs increase most in the Northeast (66.89 percent), Plains (41.07 percent) and Corn Belt (23.05 percent) regions. The West and South receive 10.61 and 8.65 percent increases, respectively.

Net Cash Farm Income. U.S. net cash farm income falls 4.6 percent ($2.51 billion) from 1994 to 2000. This decrease is mainly the result of a price squeeze. U.S. farmers face a price squeeze resulting from target prices being frozen at 1990 levels, while the costs of production increase due to inflation. Only the West and South are projected to experience growth in net cash farm income. Since these regions also experience the smallest growth in government payments, it seems these regions' farmers are the least reliant on farm program crops.

Net cash farm income increases 9.33 percent ($1.1 billion) in the West and 8.35 percent ($1.35 billion) in the South. The projected decreases for the Plains, Northeast and Corn Belt are 16.23, 14.92, and 25.84 percent, respectively. In the year 2000, the Corn Belt and Plains regions' will receive 30 and 40 percent (respectively) of their net cash farm income from government payments.

Measures of Financial Performance

Debt-to-Asset Ratio. All five regions' debt-to-asset ratios increase from 1994 to 2000 if growth in the money supply is slowed. This increase results from

increased debt levels in every region and lower regional asset values (except in the West). The West's debt-to-asset ratio increases (from 0.16 to 0.17), because the 11.01 percent increase in debt outweighs the 1.68 percent growth in assets (1994 to 2000). The debt-to-asset ratio changes the most in 1997 when CRP land comes back into production.

The Northeast region has the lowest beginning (0.12) and ending (0.14) debt-to-asset ratio. The highest ending leverage ratios occur in the Plains (0.20) and South (0.19) regions. The Corn Belt's leverage ratio starts at 0.16 and increases to 0.18 in the year 2000.

Financial Leverage Index. The FLI is projected to decrease in every region from 1994 to 2000. This decrease is obvious for those regions (Plains, Northeast and Corn Belt) whose debt levels increase while their net cash farm income falls. The remaining regions' (West and South) FLIs decrease, because their respective income growth rates (9.33 and 8.35 percent) are surpassed by their debt growth rates (9.69 and 11.01 percent). Only the South is projected to have a FLI above one (1.06) in the year 2000. The Corn Belt is expected to have the lowest FLI (0.75) in the year 2000.

Times-Interest-Earned Ratio and Past Dues. The TIE ratio will decrease in every region from 1994 to 2000. The Plains, Northeast and Corn Belt regions'

TIE ratio falls, due to a rapid growth in interest expense and negative growth in net cash farm income. The West and South regions' TIE ratio falls, because their interest expense grows over 40 percent, while net cash farm income only grows about 9 percent from 1994 to 2000. The South will always have the highest TIE ratio (6.72 in the year 2000). The lowest TIE ratios are projected (in the year 2000) in the Plains (2.88) and Corn Belt (2.61) regions.

Past dues are negatively related to the TIE ratio. Since the TIE ratio is projected to decrease in every region, past dues will increase in all regions. The South is projected to have the lowest levels of past dues (1.4 percent in the year 2000), as it has the highest TIE ratio from 1994 to 2000. The Plains region experiences the largest percentage increase (138 percent) in past dues, since it also has the largest percentage decrease (37 percent) in the TIE ratio. The Corn Belt and Northeast regions' past dues increase 120 and 76 percent, respectively. Delinquencies in the West increase 41 percent (1.7 to 2.4) from 1994 to 2000.

Debt Burden Ratio and Bankruptcies. The Plains, Northeast and Corn Belt regions' debt burden ratios increase, due to increased debt levels and negative growth in net cash farm income. Overall, the West and South regions experience little change in their debt burden ratios. This occurs because the growth rates for debt and income are similar within each region. For example, income (in the West) grows 9.33 percent while debt increases 9.69 percent from 1994 to 2000.

Bankruptcies are positively related to the lag of the debt burden ratio. Thus, the Plains and Corn Belt regions' bankruptcies increase (27 percent and 13 percent, respectively), due to higher debt burden ratios. Bankruptcy rates fall 14 percent in the West region from 1994 to 2000. This region's debt burden ratio varies less than 4 percent during this time period. Bankruptcies in the South increase 15 percent from 1994 to 1996 and then remain unchanged.

Bankruptcies in the Northeast decrease 29 percent (from 3.1 to 2.2) even though the debt burden ratio increases 23.5 percent from 1994 to 2000. The reason for this surprising result is that bankruptcies fall the most (from 3.1 to 2.3 percent) from 1994 to 1995. This decrease occurs one year after the debt burden ratio falls 34.4 percent. Bankruptcies are unchanged from 1996 to 1999 as the debt burden ratio only varies 6.1 percent from 1995 to 1998.

Comparing a Reduction in Money Supply Growth to the Baseline

Figures in each of the following sections provide a graphical comparison between a two percent slower growth rate in the money supply and the baseline for the six measures of financial stress used in this study. Tables (A11 - A15 in the appendix) provide data on annual levels, annual percentage change and percent deviation from baseline for all six measures of financial stress.

Impact on West Region

Past dues are projected to increase from 1.7 to 2.4 percent of farm borrowers and be roughly 15 percent above baseline by the year 2000 (Figure 4.16). This increase is driven by the fact past dues are a function of the times-interest-earned ratio. The times interest earned (TIE) ratio is approximately 10 percent below the baseline, due to the higher farm interest expense that resulted from higher interest rates.

Farm bankruptcies decrease from 2.2 to 1.9 percent of farmers and are 1.5 percent above baseline in the year 2000. The minor change in bankruptcies is the result of a debt burden ratio that varies less than 2.5 percent in either scenario. The debt burden ratio is stationary, because debt and income grow at almost identical rates of 9.69 (11.21 in baseline) and 9.33 (10.96 in baseline) percent, respectively.

The debt-to-asset ratio increases from 0.16 to 0.173 and is 1.3 percent below baseline in 2000. Leverage increases because farm debt growth (9.7 percent) outpaces asset growth (1.68 percent) from 1994 to 2000. The FLI falls from 1.01 to 0.98 and is 2 percent below baseline.

Impact on Plains Region

Delinquencies increase from 1.3 to 3.1 percent of farm borrowers and will be roughly 20 percent above baseline for the latter part of this decade
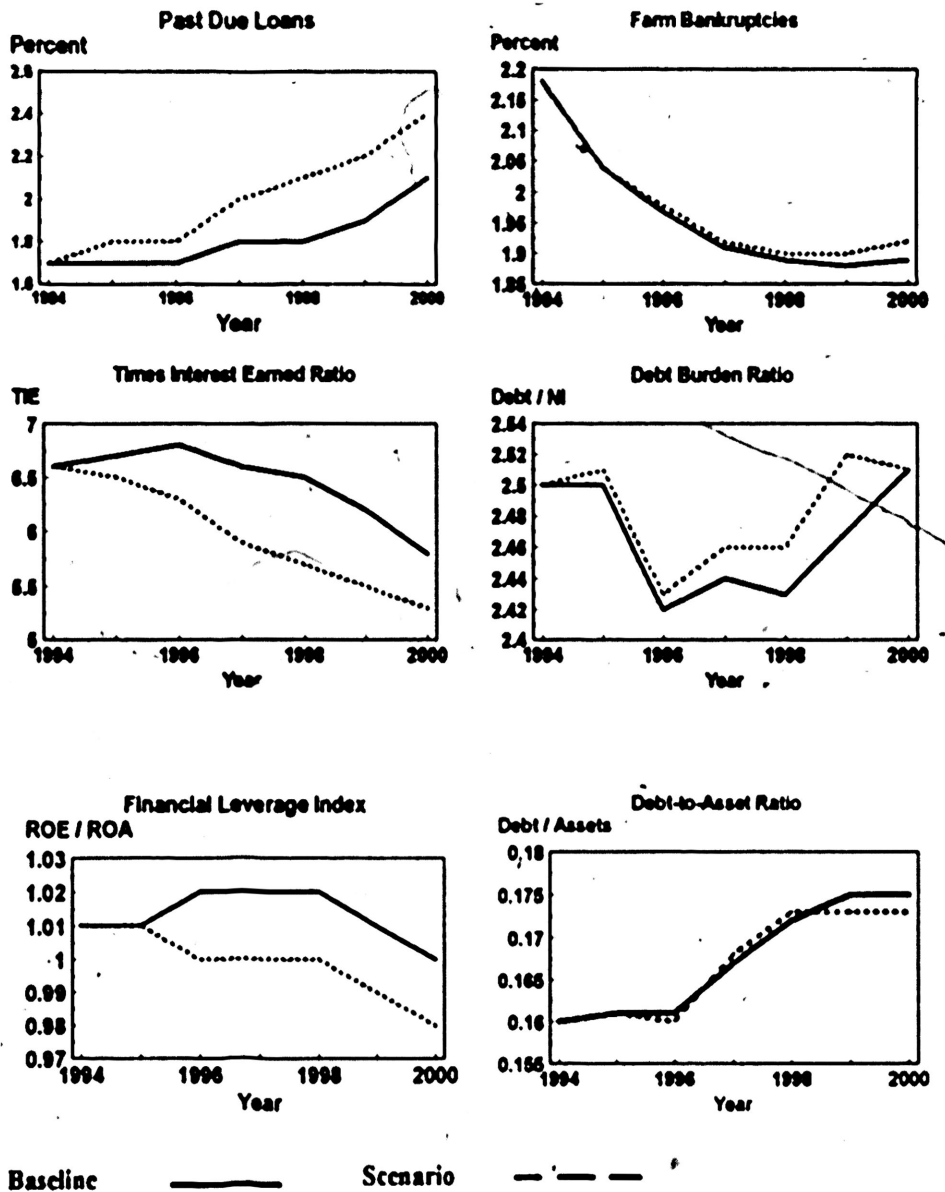
Figure 4.16. Comparing a Two Percent Slower Growth
Rate in the Money Supply to Baseline for the West Region

(Figure 4.17). Interest expense increases faster than the baseline (58 versus 41 percent) when the growth in the money supply is reduced, due to higher interest rates. Net cash farm income falls 16 (5 in baseline) percent from 1994 to 2000. Thus, the times-interest-earned ratio falls 36.7 percent and is 15.2 percent below baseline in the year 2000.

Farm bankruptcies mimic the baseline's marginal increase from 1.5 to 1.9 percent of farmers. Bankruptcies increase due to a 29 percent increase in the debt burden ratio. This ratio increases, because debt grows 7.9 percent and net cash farm income falls 16.2 percent from 1994 to 2000. The financial leverage index is projected to fall from 0.94 to 0.82 and be 7.4 percent below baseline by the year 2000. This means that, collectively, farmers in the Plains region would not be earning a profit from their use of debt. The debt-to-asset ratio increases from 0.173 to 0.20 (both scenarios), because farm asset values fall 6.4 percent and farm debt increases 7.9 percent.

Impact on Northeast Region

Past dues will increase about 75 percent (from 1.7 to 3 percent of farmer borrowers) by the year 2000. They will be roughly 20 percent above the baseline for the last three years of this century (Figure 4.18). The TIE ratio decreases 33 percent and is 11 percent below baseline in the year 2000. This fall results from a 40 percent increase in interest expense and a 15 percent decline in farm income

Baseline ——— Scenario — — —
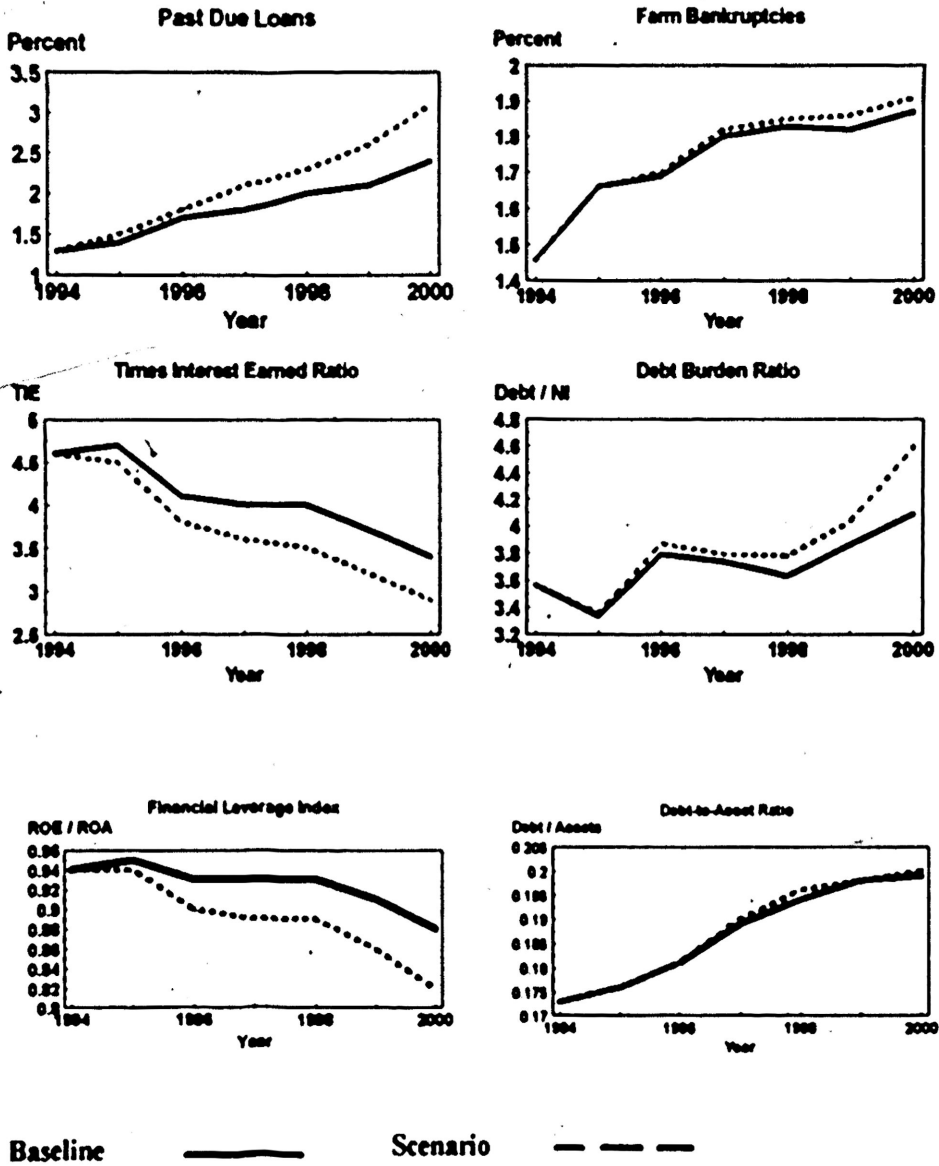
Figure 4.17. Comparing a Two Percent Slower Growth
Rate in the Money Supply to Baseline for the Plains Region
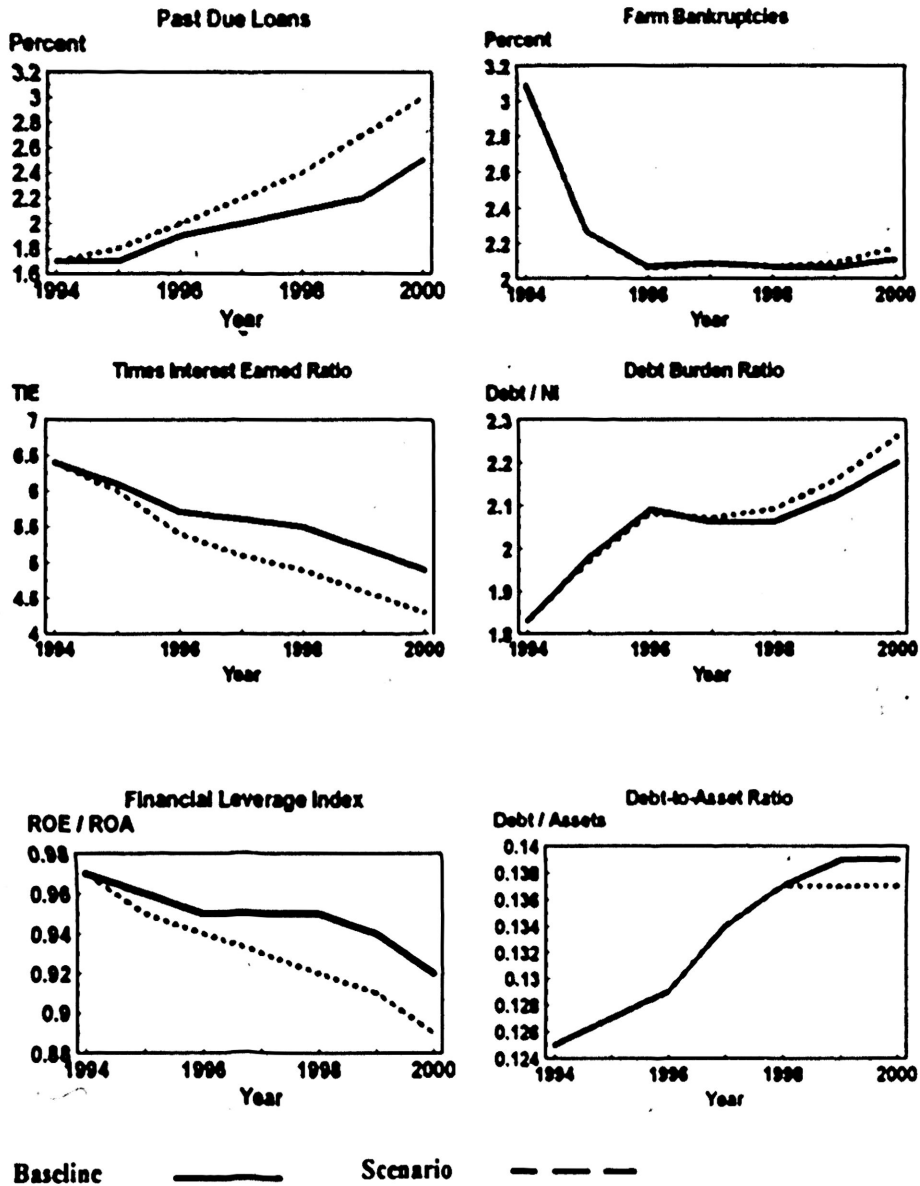
Figure 4.18. Comparing a Two Percent Slower Growth
Rate in the Money Supply to Baseline for the Northeast Region

from 1994 to 2000.

Bankruptcies decrease 26 percent (from 3.1 to 2.3 percent of farmers) from 1994 to 1995 (both scenarios), because the debt burden ratio falls 35 percent from 1993 to 1994. After 1995, bankruptcies remain basically unchanged. The debt burden ratio increases from 1.83 to 2.3, due to the fall in net income and a 4.7 percent increase in debt. This region's low debt burden ratio is less than half the ratio in the Plains (4.6) and Corn Belt (5.1) regions in the year 2000.

The Northeast is projected to have the lowest debt-to-asset ratio of all regions under either scenario. The leverage ratio increases from 0.12 to 0.14, because debt levels grow 4.7 percent while asset values fall 4.7 percent from 1994 to 2000. ELI decreases from 0.97 to 0.89 for the same reasons stated in previous regions.

Impact on Corn Belt Region

The Corn Belt region is expected see delinquencies increase from 1 to 2.2 percent of farm borrowers and be 47 percent above baseline in the year 2000 (Figure 4.19). Past due farm loans start to increase significantly above the baseline in 1998. The TIE ratio falls (for the same reasons it falls in the Plains) from 4.3 to 2.6 and is 22 percent below baseline in the year 2000.

Farm bankruptcies are expected to increase slightly from 1.6 to 1.8 percent of farmers (both scenarios) from 1994 to 2000. The debt burden ratio rises from
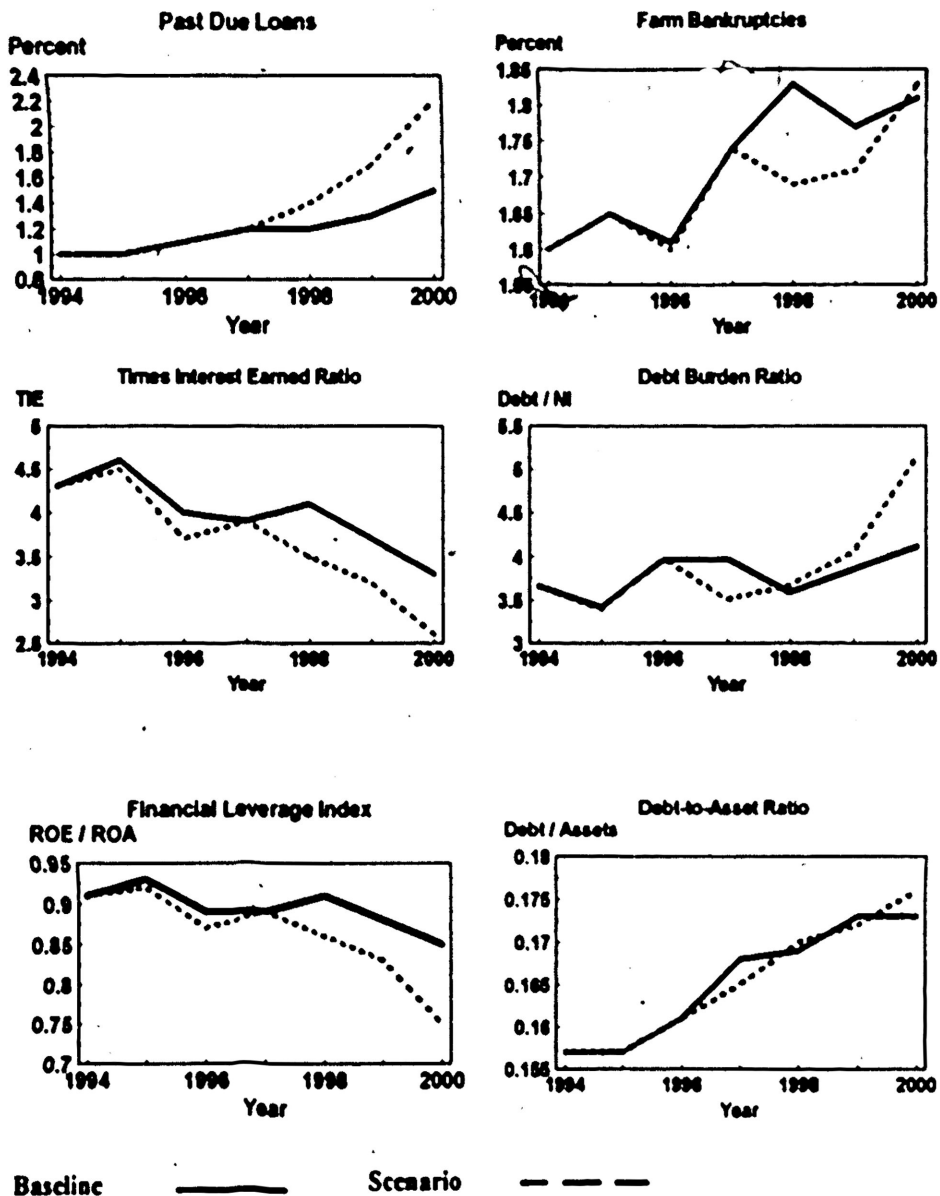
Figure 4.19. Comparing a Two Percent Slower Growth /
Rate in the Money Supply to Baseline for the Corn Belt Region

3.7 to 5.15 (for the same reasons given in the Plains' section) and is 25 percent above baseline in the year 2000. The financial leverage index decreases from 0.91 in 1994 to 0.75 in 2000, at which time it is 12 percent below baseline. The Corn Belt has the lowest FLI in the nation. The debt-to-asset ratio increases from 0.16 to 0.175 (both scenarios) as debt increases (4.3 percent) and asset values fall 7.1 percent from 1994 to 2000.

The Corn Belt's net cash farm income is highly dependent on farm program payments. From 1994 to 1998, net cash farm income grew by 5 percent. However, government payments for this region increased 150 percent during this time period. Over the projected time period, farm program payments totalled $18 billion and comprised (on average) 34 percent of net cash farm income.

Impact on South Region

Beginning in 1997, delinquencies will average about 20 percent above the baseline (Figure 4.20). The TIE ratio falls 22 percent (to 6.7) over the projected time period. However, it remains the highest of any region and over twice the level present in the Plains (2.9) and Corn Belt (2.6) regions. The TIE ratio is 10 percent below the baseline from 1997 to 2000, because higher interest rates cause interest expense growth (44 percent) to be 15 percent above baseline. Net cash farm income growth is similar (8 percent) in both scenarios.

Bankruptcies are expected to increase from 1.3 to 1.5 percent of farmers
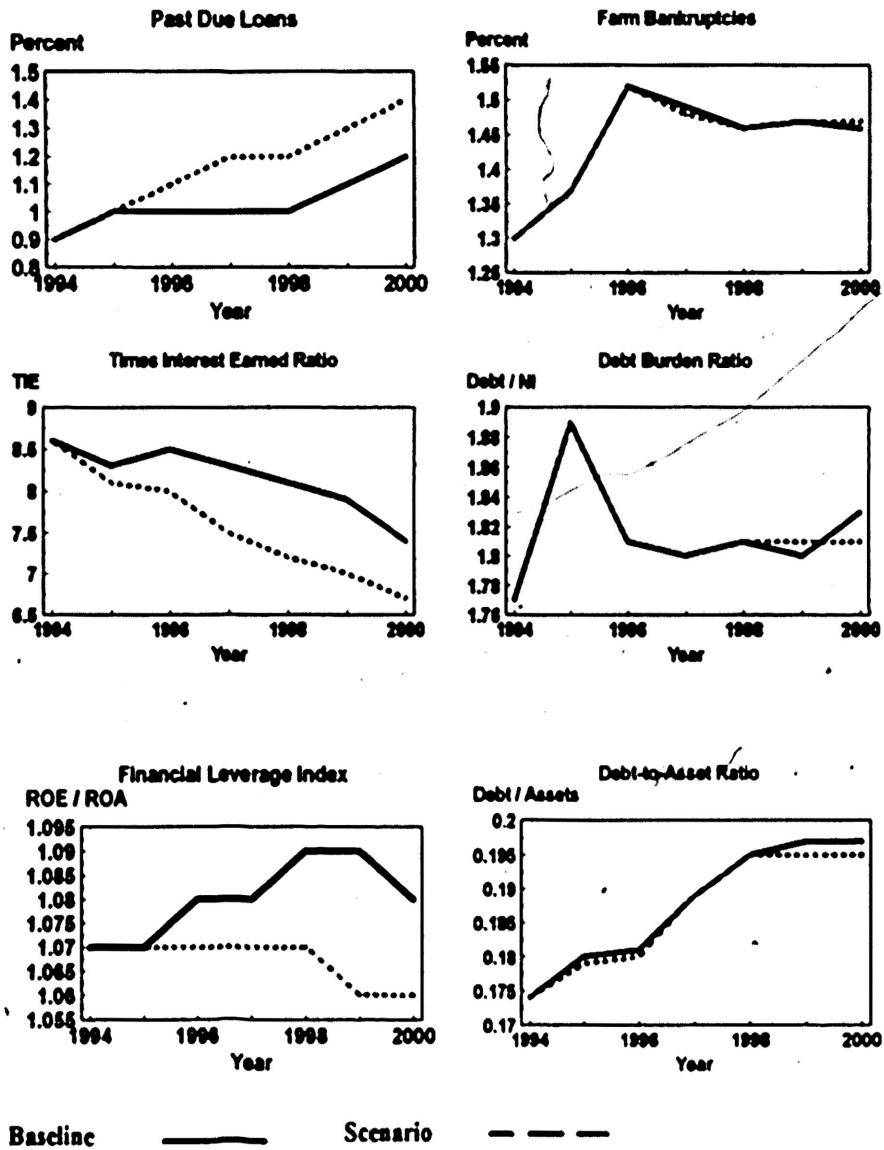
Figure 4.20. Comparing a Two Percent Slower Growth
Rate in the Money Supply to Baseline for the South Region

(both scenarios) from 1994 to 2000. The debt burden ratio increases slightly from 1.77 to 1.81 (both scenarios), due to an 11 percent increase in debt which barely outpaces an 8.4 percent increase in farm income. The South is projected to have the only financial leverage index above one (1.06 in the year 2000). This means farmers will profit from using leverage. The debt-to-asset ratio increases (both scenarios) from 0.175 to 0.195 (for the same reasons given in the Corn Belt section).

Summary

This chapter compared the financial stress affects from three separate government policy alternatives to a baseline scenario that assumed the CRP was eliminated. The AG-GEM model's projections of five major farm sector variables were discussed for each policy scenario. A detailed explanation of how these variables affected the six measures of regional financial stress used in this study was then provided for each scenario. Separate regional comparisons of the financial stress measures were done between each of the three policy scenarios and the baseline.

In general, the South region experiences the least financial stress of any region for all policy scenarios. The Corn Belt and Plains regions suffer the highest level of financial stress in the U.S., especially when target prices are cut 10 percent or the growth in the money supply is reduced 2 percent a year.

Overall, a reduction in money supply is the most financially stressful of all policy alternatives analyzed in this study.

A surprising result is that farmers actually experience more financial stress if CRP is continued, than if it is eliminated. This mainly occurs because farmers receive higher deficiency payments if CRP is eliminated. The elimination of CRP drives down market prices, because it brings farm land back into production which increases the supply of farm program crops. If CRP is continued, total farm program costs from 1996 to 2000 are 19 percent below baseline. The lowest government costs (from 1996 to 2000) are achieved by cutting the target price 10 percent. This results in farm program costs that are 39 percent below baseline.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The severe financial stress U.S. farmers experienced in the 1980s had many causes and affects. A rapid increase in real net farm income and U.S. agricultural exports in the early 1970s encouraged farmers to rapidly expand their operations in the belief this would maximize future profits. This expansion was funded by a huge increase in borrowing from agricultural lending institutions who were eager to increase their own market share of agricultural loans. Lenders usual concern over loan defaults was minimized by the rising values in the assets they held as collateral.

In the 1980s, farmers were hard pressed to meet their high debt repayment obligations due to low levels of net farm income. Furthermore, the value of collateral for farm mortgage loans plummeted. Farmers' financial deterioration in the 1980s is evident by the high loan loss levels on agricultural loans and the number of agricultural bank failures. The U.S. government sought to reduce farmers financial stress by dramatically increasing farm program payments in the late 1980s.

Farmers and agricultural lenders memory of the last two decades has resulted

in a more conservative approach to borrowing and lending practices in the 1990s. However, even with agriculture's reduced debt level, farmers still face the possibility of renewed financial stress. This possibility exists due to the significant amount of net income that farmers derive from farm program payments. These payments will likely be reduced as Congress is currently debating whether to eliminate or cut several farm programs in order to help balance the federal budget.

In particular, the Conservation Reserve Program (CRP) is receiving considerable attention. CRP was established by Congress in the 1985 Farm Act as a voluntary long-term cropland retirement program. About eight percent of U.S. cropland (36.4 million acres) is currently enrolled in CRP at an annual cost of $1.8 billion. Contracts covering more than 24 million acres will expire in 1996 and 1997.

CRP acres are concentrated in the Plains and western Corn Belt regions. Thus, policy alternatives dealing with the elimination or continuation of CRP will have different regional financial stress affects on farmers. Another policy alternative being considered is to reduce the target price ten percent on all farm program crops. This alternative is expected to lower government cost by decreasing deficiency payments to farmers.

The main objective of this study was the application of estimated equations and other indicators of financial stress to policy analysis. The percent of farm

loan volume delinquent 30 days or more at a financial institution and percent of farmers in the institution's lending area who have filed for bankruptcy were two of the financial stress indicators analyzed in this study. Others included the times-interest-earned ratio, the debt burden ratio, the financial leverage index, and the debt-to-asset ratio.

All of the above measures of financial stress were projected for a baseline scenario and three other policy alternatives. The baseline was then separately compared to each of the three policy scenarios. An analysis was then done on the trends in a broad set of short-run and long-run measures of financial stress to determine the relative impacts different policies had on the regional financial stress of farmers.

Chapter II discusses previous studies and theories regarding a set of aggregate economic and financial indicators used in measuring aggregate financial stress in agriculture. Previous studies relevant to this research are summarized in the first three sections of Chapter II: (1) analyzing aggregate financial stress and risk, (2) the relationship between macroeconomy and financial sector and (3) financial ratios as predictors of financial stress. The remaining sections discuss three categories of financial measures often used in analyzing the level of financial stress. These categories are profitability, leverage, and the ability to service debt. Different measures within each category are defined. Also, their purpose and limitations are explained.

Chapter III reports the coefficient estimates developed in this study and discusses the results of various methods used to validate the regional financial stress model. The first section of Chapter III outlines this study's model, explains the assumptions for its selection and reports the results from the test of these assumptions. The second section details validation methods, the model's coefficient estimates, their statistical significance, R^2 and the negative test results for autocorrelation.

Regional past due equations were found to explain between 64 and 84 percent of the variation in regional past dues. Regional bankruptcy equations explained between 48 and 86 percent of the variation in regional bankruptcies. Coefficients in both models were all found to be of proper sign and statistically significant. The third section of Chapter III developed a test for structural change and reported that this test for change was negative. Finally, the fourth section reported the results of forecasting the model using within sample data.

Chapter IV analyzed the regional results from four policy scenarios on six measures of financial stress. The AG-GEM model's projections of five major farm sector variables were discussed for each policy alternative. A detailed discussion of how these variables effected the six measures of regional financial stress used in this study was then provided for each scenario.

Model results were analyzed by comparing regional financial stress measures from each of three policy scenarios to a baseline scenario. For this study, the

baseline scenario assumed that the CRP is eliminated. The other three scenarios being compared to the baseline are: a continuation of CRP, eliminate CRP plus reduce target prices ten percent, and a two percent reduction in the growth rate of the money supply in addition to eliminating CRP.

Conclusions

A two percent reduction in the growth rate of the money supply was the most financially stressful of the four policy alternatives analyzed in this study. The Corn Belt and Plains regions experienced the highest level of financial stress in the U.S. for all scenarios. Farm financial stress in these regions was most acute if, in addition to eliminating CRP, target prices were reduced or the growth in the money supply was slowed. This is interesting from a policy perspective, since these two regions contain nearly sixty percent of the acres currently in the Conservation Reserve Program. In general, the South region experienced the least financial stress of any region for all policy scenarios.

A surprising result is that farmers actually experience more financial stress if CRP is continued, than if it is eliminated. In fact, the elimination of the CRP was the least financially stressful of all policy alternatives considered in this study. This mainly occurs because farmers receive higher deficiency payments if CRP is eliminated. The elimination of CRP drives down market prices, because it brings farm land back into production which increases the supply of farm program

crops.

Farm program payments were highest if CRP is eliminated. Under this policy alternative, budget outlays to farmers would increase $4 billion from 1994 to 2000. If CRP is continued, total farm program costs from 1996 to 2000 would be 19 percent below baseline. The lowest government costs (from 1996 to 2000) were achieved by cutting the target price 10 percent. This results in farm program costs that are 39 percent below baseline.

The debt-to-asset ratio was the most widely used measure of financial stress prior to the mid-1980s. However, this study's results support previous research findings that other measures possess better predictive ability of financial stress than the debt-to-asset ratio. This study found the times-interest-earned ratio was the best predictor of farm loan delinquency. In modeling farm bankruptcy, the debt burden ratio was the best independent variable.

Both of these independent variables appear logical within their respective models. In the short-run, farm operations must generate sufficient cash flow to meet current interest expense or their loans will become delinquent. Since the times-interest-earned ratio measures the relationship between cash flow and interest expense, it is a logical choice as a predictive variable. Similarly, in the long-run, farm income must be sufficient to cover principal payments or bankruptcy will result. The debt burden ratio measures the relationship between farm debt and income. Thus, the debt burden ratio's predictive ability within a

bankruptcy model has intuitive appeal.

Limitations

The most severe limitation faced in this study was the lack of historical data on measures of farmers financial stress. It appears the severe financial stress farmers experienced in the 1980s provided the impetus for agencies, such as the USDA-ERS, to start collecting information on several different financial stress measures. The limited years of data available on past due farm loans and farm bankruptcies at the regional level restricted the number of explanatory variables used in this study's model.

A limitation of this study's model results is that no distinction was made by type of farm in each region. It is expected that financial stress levels differ between various commodity producers within any given region. Another potential limitation is that this study's projections implicitly assume that future bank lending policies will be similar to those present during the 1980s. Also, this study's projections are affected by the standard errors from the AG-GEM model's forecasts of the independent variables used in this study.

Suggestions for Future Research

Within the existing framework of this study's model, different policy alternatives could be examined to determine their impact on farmers financial

stress. As more data becomes available over time, it will be possible to re-estimate this study's equations. Additional data will strengthen model validation efforts by allowing for out-of-sample forecasts. In addition, tests for structural change at the regional level can then be performed.

Future research might also focus on the financial stress levels of particular commodity producers within a particular region or state. In addition, other applied research could consider using financial stress measures to forecast the expected risk agri-businesses face by extending credit to farmers.

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APPENDIX A

TABLES

Table A1. West Region: Stress Measures for Baseline and Continue CRP

POLICY SCENARIO: Continue CRP	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
WEST REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.7	1.8	1.8	1.9	2.1
% change from a year ago	21.5	1.4	-1.3	3.7	2.3	6.0	7.2
Level in Policy Scenario	1.7	1.7	1.7	1.8	1.9	2.0	2.1
% change from a year ago	21.5	1.4	-1.3	6.4	5.0	6.2	6.4
% deviation from Baseline	-0.0	-0.0	-0.1	2.6	5.4	5.5	4.6
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	2.2	2.0	2.0	1.9	1.9	1.9	1.9
% change from a year ago	-22.0	-6.7	-3.1	-3.1	-1.1	-0.7	0.6
Level in Policy Scenario	2.2	2.0	2.0	1.9	1.9	1.9	2.0
% change from a year ago	-22.0	-6.7	-3.1	-3.1	0.5	1.3	1.4
% deviation from Baseline	0.0	0.0	0.0	-0.0	1.5	3.5	4.3
Times Interest Earned Ratio							
Level in Baseline	6.6	6.7	6.8	6.6	6.5	6.2	5.8
% change from a year ago	-8.5	1.4	1.3	-3.3	-1.5	-4.7	-5.2
Level in Policy Scenario	6.60	6.69	6.79	6.41	6.20	5.92	5.65
% change from a year ago	-8.5	1.4	1.4	-5.5	-3.4	-4.5	-4.6
% deviation from Baseline	0.0	0.0	0.1	-2.2	-4.1	-3.9	-3.3
Debt Burden Ratio							
Level in Baseline	2.5	2.5	2.4	2.4	2.4	2.5	2.5
% change from a year ago	7.6	0.0	-3.1	0.6	-0.5	1.8	1.5
Level in Policy Scenario	2.50	2.50	2.42	2.51	2.55	2.59	2.61
% change from a year ago	7.6	0.0	-3.2	3.4	1.9	1.5	0.7
% deviation from Baseline	0.0	0.0	-0.1	2.7	5.2	4.9	4.2
Financial Leverage Index							
Level in Baseline	1.0	1.0	1.0	1.0	1.0	1.0	1.0
% change from a year ago	-1.2	0.3	0.2	0.2	0.3	-0.6	-1.0
Level in Policy Scenario	1.01	1.01	1.02	1.01	1.00	0.99	0.98
% change from a year ago	-1.2	0.3	0.2	-0.9	-0.4	-1.0	-1.1
% deviation from Baseline	0.0	0.0	0.0	-1.1	-1.8	-2.2	-2.4
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	1.8	0.4	-0.1	4.1	2.8	1.6	0.3
Level in Policy Scenario	0.16	0.16	0.16	0.16	0.16	0.16	0.16
% change from a year ago	1.8	0.4	-0.1	0.5	1.3	-0.6	-0.8
% deviation from Baseline	0.0	0.0	0.0	-3.5	-4.9	-6.9	-7.9

Table A2. Plains Region: Stress Measures for Baseline and Continue CRP

POLICY SCENARIO: Continue CRP	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
PLAINS REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.3	1.4	1.7	1.8	2.0	2.1	2.4
% change from a year ago	28.9	-10.6	17.0	11.0	5.6	9.8	12.7
Level in Policy Scenario	1.3	1.4	1.7	1.9	2.1	2.4	2.7
% change from a year ago	28.9	10.6	16.7	11.8	10.5	15.4	14.3
% deviation from Baseline	0.0	0.0	-0.3	0.5	5.2	10.6	12.2
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.5	1.7	1.7	1.8	1.8	1.8	1.9
% change from a year ago	-8.8	13.5	2.3	6.2	1.9	-0.5	2.3
Level in Policy Scenario	1.5	1.7	1.7	1.8	1.8	1.9	2.0
% change from a year ago	-8.8	13.5	2.3	6.0	2.4	2.4	5.4
% deviation from Baseline	0.0	0.0	0.0	-0.2	0.3	3.3	6.4
Times Interest Earned							
Level in Baseline	4.6	4.7	4.1	4.0	4.0	3.7	3.4
% change from a year ago	-32.0	3.0	-11.8	-3.0	-0.3	-7.5	-8.2
Level in Policy Scenario	4.55	4.69	4.15	3.98	3.78	3.39	3.15
% change from a year ago	-32.0	3.0	-11.5	-4.0	-5.1	-10.4	-7.1
% deviation from Baseline	0.0	0.0	0.3	-0.7	-5.5	-8.4	-7.4
Debt Burden Ratio							
Level in Baseline	3.6	3.3	3.8	3.7	3.6	3.9	4.1
% change from a year ago	49.4	-6.3	13.5	-1.2	-2.9	6.2	6.1
Level in Policy Scenario	3.56	3.34	3.77	3.78	3.92	4.36	4.57
% change from a year ago	49.4	-6.3	13.1	0.2	3.7	11.4	4.7
% deviation from Baseline	0.0	0.0	-0.4	1.0	7.9	13.1	11.6
Financial Leverage Index							
Level in Baseline	0.9	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-6.3	1.2	-3.1	0.0	0.5	-2.3	-3.1
Level in Policy Scenario	0.94	0.95	0.93	0.92	0.90	0.86	0.84
% change from a year ago	-6.3	1.2	-3.0	-1.2	-1.5	-4.2	-3.3
% deviation from Baseline	0.0	0.0	0.1	-1.1	-3.1	-5.0	-5.1
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	11.5	1.6	2.6	4.6	2.7	1.9	0.7
Level in Policy Scenario	0.17	0.18	0.18	0.18	0.18	0.18	0.18
% change from a year ago	11.5	1.6	2.6	0.8	1.5	-0.1	-0.4
% deviation from Baseline	0.0	0.0	0.0	-3.7	-4.8	-6.7	-7.7

Table A3. Northeast Region: Stress Measures for Baseline and Continue CRP

	Projected Measures of Regional Financial Stress in Agriculture						
POLICY **SCENARIO: Continue CRP**							
				Year			
NORTHEAST REGION	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.9	2.0	2.1	2.2	2.5
% change from a year ago	-6.8	3.0	8.8	5.1	4.4	7.9	10.9
Level in Policy Scenario	1.7	1.7	1.9	2.0	2.1	2.3	2.5
% change from a year ago	-6.8	3.0	8.7	5.5	4.1	10.9	11.3
% deviation from Baseline	0.0	0.0	-0.1	0.2	-0.0	2.8	3.1
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	3.1	2.3	2.1	2.1	2.1	2.1	2.1
% change from a year ago	23.5	-26.7	-8.4	0.7	-1.0	-0.3	2.4
Level in Policy Scenario	3.1	2.3	2.1	2.1	2.1	2.1	2.2
% change from a year ago	23.5	-26.7	-8.4	0.6	-0.6	-0.6	5.6
% deviation from Baseline	0.0	0.0	0.0	-0.1	0.3	0.0	3.2
Times Interest Earned							
Level in Baseline	6.4	6.1	5.7	5.6	5.5	5.2	4.9
% change from a year ago	5.4	-4.9	-6.5	-1.8	-2.2	-5.4	-6.8
Level in Policy Scenario	6.4	6.1	5.7	5.6	5.5	5.1	4.8
% change from a year ago	5.4	-4.9	-6.4	-2.1	-1.9	-7.8	-6.2
% deviation from Baseline	0.0	0.0	0.1	-0.3	0.1	-2.5	-1.9
Debt Burden Ratio							
Level in Baseline	1.8	2.0	2.1	2.1	2.1	2.1	2.2
% change from a year ago	-34.3	7.9	5.5	-1.4	0.2	2.6	3.7
Level in Policy Scenario	1.83	1.98	2.09	2.07	2.06	2.18	2.25
% change from a year ago	-34.3	7.9	5.4	-1.0	-0.2	5.9	3.1
% deviation from Baseline	0.0	0.0	-0.1	0.3	-0.1	3.1	2.5
Financial Leverage Index							
Level in Baseline	1.0	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-3.6	-0.7	-1.2	0.1	-0.1	-1.1	-1.8
Level in Policy Scenario	0.97	0.96	0.95	0.94	0.94	0.92	0.91
% change from a year ago	-3.6	-0.7	-1.1	-0.6	-0.4	-1.9	-1.8
% deviation from Baseline	0.0	0.0	0.0	-0.7	-0.9	-1.8	-1.8
Debt-to-Asset Ratio							
Level in Baseline	0.1	0.1	0.1	0.1	0.1	0.1	0.1
% change from a year ago	-24.1	2.1	1.5	3.5	2.6	1.3	-0.2
Level in Policy Scenario	0.12	0.13	0.13	0.13	0.13	0.13	0.13
% change from a year ago	-24.1	2.1	1.5	-0.7	0.4	-0.3	-1.0
% deviation from Baseline	0.0	0.0	0.0	-4.0	-6.1	-7.5	-8.3

Table A4. Corn Belt Region: Stress Measures for Baseline and Continue CRP

POLICY SCENARIO: Continue CRP	Projected Measures of Regional Financial Stress in Agriculture						
CORN BELT REGION	**Year**						
	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.0	1.0	1.1	1.2	1.2	1.3	1.5
% change from a year ago	1.0	-4.4	10.6	9.5	1.2	9.4	16.9
Level in Policy Scenario	1.0	1.0	1.1	1.2	1.2	1.4	1.7
% change from a year ago	1.0	-4.4	10.4	9.9	1.0	20.5	20.8
% deviation from Baseline	0.0	0.0	-0.2	0.2	-0.1	10.1	13.7
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.6	1.6	1.6	1.7	1.8	1.8	1.8
% change from a year ago	-5.9	2.9	-2.4	8.0	5.1	-3.2	2.4
Level in Policy Scenario	1.6	1.6	1.6	1.7	1.8	1.8	2.0
% change from a year ago	-5.9	2.9	-2.4	7.8	5.5	-3.4	12.3
% deviation from Baseline	0.0	0.0	0.0	-0.2	0.2	-0.1	9.6
Times Interest Earned							
Level in Baseline	4.3	4.6	4.0	3.9	4.1	3.7	3.3
% change from a year ago	-14.3	5.7	-13.0	-2.7	5.1	-8.4	-10.0
Level in Policy Scenario	4.31	4.56	3.97	3.84	4.06	3.35	3.11
% change from a year ago	-14.3	5.7	-12.9	-3.2	5.6	-17.6	-7.1
% deviation from Baseline	0.0	0.0	0.2	-0.3	0.2	-9.8	-6.9
Debt Burden Ratio							
Level in Baseline	3.7	3.4	4.0	4.0	3.6	3.8	4.1
% change from a year ago	11.2	-6.5	15.7	0.1	-9.6	7.3	6.7
Level in Policy Scenario	3.66	3.42	3.95	3.99	3.58	4.45	4.56
% change from a year ago	11.2	-6.5	15.4	0.9	-10.2	24.3	2.5
% deviation from Baseline	0.0	0.0	-0.3	0.4	-0.3	15.6	11.0
Financial Leverage Index							
Level in Baseline	0.9	0.9	0.9	0.9	0.9	0.9	0.8
% change from a year ago	-4.4	1.6	-3.7	-0.2	1.9	-2.6	-4.0
Level in Policy Scenario	0.91	0.93	0.89	0.88	0.90	0.84	0.81
% change from a year ago	-4.4	1.6	-3.6	-1.2	1.6	-6.6	-3.5
% deviation from Baseline	0.0	0.0	0.1	-0.9	-1.2	-5.2	-4.7
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	-1.4	0.0	2.8	3.8	0.8	2.1	0.4
Level in Policy Scenario	0.16	0.16	0.16	0.16	0.16	0.16	0.16
% change from a year ago	-1.4	0.0	2.8	-0.4	-1.4	2.2	-1.1
% deviation from Baseline	0.0	0.0	0.0	-4.0	-6.1	-6.0	-7.4

Table A5. South Region: Stress Measures for Baseline and Continue CRP

POLICY SCENARIO: Continue CRP SOUTH REGION	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	0.9	1.0	1.0	1.0	1.0	1.1	1.2
% change from a year ago	30.3	9.0	-1.7	2.7	3.7	4.7	8.9
Level in Policy Scenario	0.9	1.0	1.0	1.0	1.1	1.1	1.2
% change from a year ago	30.3	9.0	-1.8	5.2	5.1	3.9	6.5
% deviation from Baseline	0.0	0.0	-0.1	2.3	3.7	2.9	0.6
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-2.1	-1.5	0.2	-0.5
Level in Policy Scenario	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-2.2	1.0	2.1	-1.0
% deviation from Baseline	0.0	0.0	0.0	-0.1	2.5	4.4	3.9
Times Interest Earned							
Level in Baseline	8.6	8.3	8.5	8.3	8.1	7.9	7.4
% change from a year ago	-0.5	-3.6	2.1	-2.1	-2.3	-2.9	-5.6
Level in Policy Scenario	8.62	8.31	8.49	8.17	7.92	7.75	7.43
% change from a year ago	-0.5	-3.6	2.2	-3.7	-3.1	-2.2	-4.1
% deviation from Baseline	0.0	0.0	0.0	-1.6	-2.4	-1.7	-0.1
Debt Burden Ratio							
Level in Baseline	1.8	1.9	1.8	1.8	1.8	1.8	1.8
% change from a year ago	9.6	6.7	-3.9	-0.6	0.5	-0.4	1.4
Level in Policy Scenario	1.77	1.89	1.81	1.84	1.86	1.84	1.83
% change from a year ago	9.6	6.7	-3.9	1.3	1.3	-1.2	-0.3
% deviation from Baseline	0.0	0.0	-0.0	1.9	2.8	2.0	0.2
Financial Leverage Index							
Level in Baseline	1.1	1.1	1.1	1.1	1.1	1.1	1.1
% change from a year ago	1.1	0.1	0.5	0.7	0.4	-0.1	-0.8
Level in Policy Scenario	1.07	1.07	1.08	1.07	1.07	1.06	1.06
% change from a year ago	1.1	0.1	0.5	-0.5	-0.2	-0.5	-0.8
% deviation from Baseline	0.0	0.0	0.0	-1.1	-1.7	-2.1	-2.1
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	6.0	2.9	0.8	4.3	3.2	1.4	0.1
Level in Policy Scenario	0.17	0.18	0.18	0.18	0.18	0.18	0.18
% change from a year ago	6.0	2.9	0.8	0.2	1.1	-0.8	-0.9
% deviation from Baseline	0.0	0.0	0.0	-3.9	-5.8	-7.9	-8.7

Table A6. West Region: Stress Measures for Baseline and 10% Cut in TP

POLICY SCENARIO: Cut Target Price 10 Percent	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
WEST REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.7	1.8	1.8	1.9	2.1
% change from a year ago	21.5	1.4	-1.3	3.7	2.3	6.0	7.2
Level in Policy Scenario	1.7	1.7	1.7	1.8	1.8	1.9	2.1
% change from a year ago	21.5	1.4	-0.5	5.0	1.8	6.1	5.9
% deviation from Baseline	-0.0	-0.0	0.8	2.1	1.6	1.7	0.4
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	2.2	2.0	2.0	1.9	1.9	1.9	1.9
% change from a year ago	-22.0	-6.7	-3.1	-3.1	-1.1	-0.7	0.6
Level in Policy Scenario	2.2	2.0	2.0	1.9	1.9	1.9	1.9
% change from a year ago	-22.0	-6.7	-3.1	-2.7	-0.2	-0.7	0.8
% deviation from Baseline	0.0	0.0	0.0	0.4	1.3	1.3	1.5
Times Interest Earned Ratio							
Level in Baseline	6.6	6.7	6.8	6.6	6.5	6.2	5.8
% change from a year ago	-8.5	1.4	1.3	-3.3	-1.5	-4.7	-5.2
Level in Policy Scenario	6.60	6.69	6.74	6.45	6.39	6.08	5.83
% change from a year ago	-8.5	1.4	0.6	-4.3	-0.9	-4.8	-4.1
% deviation from Baseline	0.0	0.0	-0.7	-1.7	-1.1	-1.3	-0.2
Debt Burden Ratio							
Level in Baseline	2.5	2.5	2.4	2.4	2.4	2.5	2.5
% change from a year ago	7.8	0.0	-3.1	0.6	-0.5	1.8	1.5
Level in Policy Scenario	2.50	2.50	2.44	2.49	2.46	2.51	2.51
% change from a year ago	7.8	0.0	-2.4	1.9	-1.1	1.9	0.1
% deviation from Baseline	0.0	0.0	0.8	2.0	-1.4	1.5	0.2
Financial Leverage Index							
Level in Baseline	1.0	1.0	1.0	1.0	1.0	1.0	1.0
% change from a year ago	-1.2	0.3	0.2	0.2	0.3	-0.6	-1.0
Level in Policy Scenario	1.01	1.01	1.01	1.01	1.02	1.01	1.00
% change from a year ago	-1.2	0.3	0.0	0.1	0.3	-0.8	-0.8
% deviation from Baseline	0.0	0.0	-0.2	-0.3	-0.3	-0.6	-0.4
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	1.8	0.4	-0.1	4.1	2.8	1.6	0.3
Level in Policy Scenario	0.16	0.16	0.16	0.17	0.17	0.17	0.17
% change from a year ago	1.8	0.4	-0.6	4.5	2.3	0.5	0.1
% deviation from Baseline	0.0	0.0	-0.5	-0.2	-0.6	-1.7	-1.8

Table A7. Plains Region: Stress Measures for Baseline and 10% Cut in TP

	Projected Measures of Regional Financial						
POLICY		Stress in Agriculture					
SCENARIO: Cut Target Price 10 Percent							
				Year			
PLAINS REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.3	1.4	1.7	1.8	2.0	2.1	2.4
% change from a year ago	28.9	10.6	17.0	11.0	5.6	9.8	12.7
Level in Policy Scenario	1.3	1.4	1.7	2.0	2.2	2.5	2.9
% change from a year ago	28.9	10.6	21.8	17.0	7.9	14.3	16.3
% deviation from Baseline	0.0	0.0	4.2	9.8	12.2	16.7	20.4
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.5	1.7	1.7	1.8	1.8	1.8	1.9
% change from a year ago	-8.8	13.5	2.3	6.2	1.9	-0.5	2.3
Level in Policy Scenario	1.5	1.7	1.7	1.8	1.9	1.9	2.0
% change from a year ago	-8.8	13.5	2.3	9.0	5.1	0.4	4.8
% deviation from Baseline	0.0	0.0	0.0	2.6	5.9	6.8	9.4
Times Interest Earned							
Level in Baseline	4.6	4.7	4.1	4.0	4.0	3.7	3.4
% change from a year ago	-32.0	3.0	-11.8	-3.0	-0.3	-7.5	-8.2
Level in Policy Scenario	4.55	4.69	3.95	3.68	3.69	3.30	2.99
% change from a year ago	-32.0	3.0	-15.9	-6.6	0.2	-10.6	-9.4
% deviation from Baseline	0.0	0.0	-4.7	-8.2	-7.7	-10.8	-12.0
Debt Burden Ratio							
Level in Baseline	3.6	3.3	3.8	3.7	3.6	3.9	4.1
% change from a year ago	49.4	-6.3	13.5	-1.2	-2.9	6.2	6.1
Level in Policy Scenario	3.56	3.34	4.04	4.20	4.05	4.53	4.93
% change from a year ago	49.4	-6.3	21.0	4.1	-3.7	11.9	8.9
% deviation from Baseline	0.0	0.0	6.6	12.3	11.4	17.3	20.5
Financial Leverage Index							
Level in Baseline	0.9	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-6.3	1.2	-3.1	0.0	0.5	-2.3	-3.1
Level in Policy Scenario	0.94	0.95	0.91	0.90	0.91	0.87	0.83
% change from a year ago	-6.3	1.2	-4.6	-1.3	0.7	-4.1	-4.3
% deviation from Baseline	0.0	0.0	-1.6	-2.9	-2.7	-4.6	-5.8
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	11.5	1.6	2.6	4.6	2.7	1.9	0.7
Level in Policy Scenario	0.17	0.18	0.18	0.19	0.19	0.20	0.20
% change from a year ago	11.5	1.6	2.6	5.2	2.4	1.2	0.8
% deviation from Baseline	0.0	0.0	-0.0	0.5	0.2	-0.5	-0.4

Table A8. Northeast Region: Stress Measures for Baseline and 10% Cut in TP

POLICY	Projected Measures of Regional Financial Stress in Agriculture						
SCENARIO: Cut Target Price 10 Percent							
				Year			
NORTHEAST REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.9	2.0	2.1	2.2	2.5
% change from a year ago	-6.8	3.0	8.8	5.1	4.4	7.9	10.9
Level in Policy Scenario	1.7	1.7	1.9	2.0	2.1	2.3	2.6
% change from a year ago	-6.8	3.0	10.1	6.7	4.2	9.4	11.0
% deviation from Baseline	0.0	0.0	1.2	2.7	2.6	4.1	4.2
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	3.1	2.3	2.1	2.1	2.1	2.1	2.1
% change from a year ago	23.5	-26.7	-8.4	0.7	-1.0	-0.3	2.4
Level in Policy Scenario	3.1	2.3	2.1	2.1	2.1	2.1	2.2
% change from a year ago	23.5	-26.7	-8.4	2.0	1.0	-0.0	4.4
% deviation from Baseline	0.0	0.0	0.0	1.3	3.3	3.6	5.5
Times Interest Earned							
Level in Baseline	6.4	6.1	5.7	5.6	5.5	5.2	4.9
% change from a year ago	5.4	-4.9	-6.5	-1.8	-2.2	-5.4	-6.8
Level in Policy Scenario	6.4	6.1	5.7	5.5	5.4	5.1	4.7
% change from a year ago	5.4	-4.9	-7.5	-2.8	-1.6	-6.7	-6.4
% deviation from Baseline	0.0	0.0	-1.1	-2.1	-1.5	-2.8	-2.4
Debt Burden Ratio							
Level in Baseline	1.8	2.0	2.1	2.1	2.1	2.1	2.2
% change from a year ago	-34.3	7.9	5.5	-1.4	0.2	2.6	3.7
Level in Policy Scenario	1.83	1.98	2.11	2.11	2.10	2.19	2.26
% change from a year ago	-34.3	7.9	6.8	-0.1	-0.5	4.4	3.2
% deviation from Baseline	0.0	0.0	1.3	2.6	1.8	3.6	3.1
Financial Leverage Index							
Level in Baseline	1.0	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-3.6	-0.7	-1.2	0.1	-0.1	-1.1	-1.8
Level in Policy Scenario	0.97	0.96	0.94	0.94	0.94	0.93	0.91
% change from a year ago	-3.6	-0.7	-1.5	-0.1	-0.0	-1.6	-1.7
% deviation from Baseline	0.0	0.0	-0.3	-0.5	-0.5	-1.0	-0.9
Debt-to-Asset Ratio							
Level in Baseline	0.1	0.1	0.1	0.1	0.1	0.1	0.1
% change from a year ago	-24.1	2.1	1.5	3.5	2.6	1.3	-0.2
Level in Policy Scenario	0.12	0.13	0.13	0.13	0.14	0.14	0.14
% change from a year ago	-24.1	2.1	0.9	3.5	2.3	0.3	-0.0
% deviation from Baseline	0.0	0.0	-0.6	-0.5	-0.8	-1.7	-1.5

Table A9. Corn Belt Region: Stress Measures for Baseline and 10% Cut in TP

POLICY SCENARIO: Cut Target Price 10 Percent	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
CORN BELT REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.0	1.0	1.1	1.2	1.2	1.3	1.5
% change from a year ago	1.0	-4.4	10.6	9.5	1.2	9.4	16.9
Level in Policy Scenario	1.0	1.0	1.1	1.3	1.3	1.7	2.1
% change from a year ago	1.0	-4.4	14.9	15.3	4.8	26.1	25.5
% deviation from Baseline	0.0	0.0	3.8	9.3	13.1	30.5	40.1
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.6	1.6	1.6	1.7	1.8	1.8	1.8
% change from a year ago	-5.9	2.9	-2.4	8.0	5.1	-3.2	2.4
Level in Policy Scenario	1.6	1.6	1.6	1.8	2.0	2.0	2.3
% change from a year ago	-5.9	2.9	-2.4	11.8	10.3	-0.1	17.8
% deviation from Baseline	0.0	0.0	0.0	3.5	8.5	11.9	28.8
Times Interest Earned							
Level in Baseline	4.3	4.6	4.0	3.9	4.1	3.7	3.3
% change from a year ago	-14.3	5.7	-13.0	-2.7	5.1	-8.4	-10.0
Level in Policy Scenario	4.31	4.56	3.81	3.60	3.77	3.04	2.80
% change from a year ago	-14.3	5.7	-16.5	-5.5	4.9	-19.5	-8.0
% deviation from Baseline	0.0	0.0	-3.9	-6.7	-6.9	-18.1	-16.3
Debt Burden Ratio							
Level in Baseline	3.7	3.4	4.0	4.0	3.6	3.8	4.1
% change from a year ago	11.2	-6.5	15.7	0.1	-9.6	7.3	6.7
Level in Policy Scenario	3.66	3.42	4.18	4.36	3.95	5.12	5.35
% change from a year ago	11.2	-6.5	22.2	4.3	-9.5	29.7	4.5
% deviation from Baseline	0.0	0.0	5.6	10.0	10.0	33.0	30.3
Financial Leverage Index							
Level in Baseline	0.9	0.9	0.9	0.9	0.9	0.9	0.8
% change from a year ago	-4.4	1.6	-3.7	-0.2	1.9	-2.6	-4.0
Level in Policy Scenario	0.91	0.93	0.88	0.87	0.88	0.81	0.78
% change from a year ago	-4.4	1.6	-5.1	-1.3	1.9	-8.1	-4.3
% deviation from Baseline	0.0	0.0	-1.4	-2.5	-2.4	-8.0	-8.2
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	-1.4	0.0	2.8	3.8	0.8	2.1	0.4
Level in Policy Scenario	0.16	0.16	0.16	0.17	0.17	0.17	0.17
% change from a year ago	-1.4	0.0	2.6	4.2	0.5	3.2	-0.1
% deviation from Baseline	0.0	0.0	-0.1	0.3	-0.0	1.1	0.6

Table A10. South Region: Stress Measures for Baseline and 10% Cut in TP

POLICY SCENARIO: Cut Target Price 10 Percent	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
SOUTH REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	0.9	1.0	1.0	1.0	1.0	1.1	1.2
% change from a year ago	30.3	9.0	-1.7	2.7	3.7	4.7	8.9
Level in Policy Scenario	0.9	1.0	1.0	1.0	1.1	1.1	1.2
% change from a year ago	30.3	9.0	-1.0	3.4	4.1	4.2	6.3
% deviation from Baseline	0.0	0.0	0.7	1.4	1.7	1.3	-1.1
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-2.1	-1.5	0.2	-0.5
Level in Policy Scenario	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-1.3	-0.7	0.7	-0.9
% deviation from Baseline	0.0	0.0	0.0	0.8	1.6	2.2	1.8
Times Interest Earned							
Level in Baseline	8.6	8.3	8.5	8.3	8.1	7.9	7.4
% change from a year ago	-0.5	-3.6	2.1	-2.1	-2.3	-2.9	-5.6
Level in Policy Scenario	8.62	8.31	8.44	8.23	8.02	7.82	7.51
% change from a year ago	-0.5	-3.6	1.6	-2.5	-2.5	-2.6	-4.0
% deviation from Baseline	0.0	0.0	-0.5	-0.9	-1.1	-0.7	0.9
Debt Burden Ratio							
Level in Baseline	1.8	1.9	1.8	1.8	1.8	1.8	1.8
% change from a year ago	9.6	6.7	-3.9	-0.6	0.5	-0.4	1.4
Level in Policy Scenario	1.77	1.89	1.82	1.82	1.83	1.82	1.81
% change from a year ago	9.6	6.7	-3.3	-0.2	0.7	-0.8	-0.5
% deviation from Baseline	0.0	0.0	0.6	1.0	1.3	0.9	-1.1
Financial Leverage Index							
Level in Baseline	1.1	1.1	1.1	1.1	1.1	1.1	1.1
% change from a year ago	1.1	0.1	0.5	0.7	0.4	-0.1	-0.8
Level in Policy Scenario	1.07	1.07	1.07	1.08	1.08	1.08	1.07
% change from a year ago	1.1	0.1	0.2	0.6	0.3	-0.3	-0.6
% deviation from Baseline	0.0	0.0	-0.2	-0.3	-0.4	-0.6	-0.4
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	6.0	2.9	0.8	4.3	3.2	1.4	0.1
Level in Policy Scenario	0.17	0.18	0.18	0.19	0.19	0.19	0.19
% change from a year ago	6.0	2.9	0.1	4.2	3.0	0.1	0.1
% deviation from Baseline	0.0	0.0	-0.7	-0.8	-1.0	-2.1	-2.1

Table A11. West: Stress Measures for Baseline and Slower Money Growth

POLICY SCENARIO: 2% Slower Growth in Money WEST REGION	Projected Measures of Regional Financial Stress in Agriculture Year						
	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.7	1.8	1.8	1.9	2.1
% change from a year ago	21.5	1.4	-1.3	3.7	2.3	6.0	7.2
Level in Policy Scenario	1.7	1.8	1.8	2.0	2.1	2.2	2.4
% change from a year ago	21.5	4.8	3.6	8.9	4.6	6.8	4.7
% deviation from Baseline	-0.0	3.4	8.5	14.0	16.7	17.5	14.8
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	2.2	2.0	2.0	1.9	1.9	1.9	1.9
% change from a year ago	-22.0	-6.7	-3.1	-3.1	-1.1	-0.7	0.6
Level in Policy Scenario	2.2	2.0	2.0	1.9	1.9	1.9	1.9
% change from a year ago	-22.0	-6.7	-2.9	-3.0	-0.6	-0.4	1.1
% deviation from Baseline	0.0	-0.0	0.1	0.2	0.6	1.0	1.5
Times Interest Earned Ratio							
Level in Baseline	6.6	6.7	6.8	6.6	6.5	6.2	5.8
% change from a year ago	-8.5	1.4	1.3	-3.3	-1.5	-4.7	-5.2
Level in Policy Scenario	6.60	6.50	6.34	5.91	5.75	5.46	5.29
% change from a year ago	-8.5	-1.5	-2.5	-6.8	-2.8	-5.0	-3.1
% deviation from Baseline	0.0	-2.9	-6.5	-9.9	-11.1	-11.4	-9.5
Debt Burden Ratio							
Level in Baseline	2.5	2.5	2.4	2.4	2.4	2.5	2.5
% change from a year ago	7.8	0.0	-3.1	0.6	-0.5	1.8	1.5
Level in Policy Scenario	2.50	2.51	2.43	2.46	2.46	2.52	2.51
% change from a year ago	7.8	0.2	-3.1	1.4	-0.2	2.4	-0.3
% deviation from Baseline	-0.0	0.2	0.3	1.0	1.2	1.9	0.1
Financial Leverage Index							
Level in Baseline	1.0	1.0	1.0	1.0	1.0	1.0	1.0
% change from a year ago	-1.2	0.3	0.2	0.2	0.3	-0.6	-1.0
Level in Policy Scenario	1.01	1.01	1.00	1.00	1.00	0.99	0.98
% change from a year ago	-1.2	-0.2	-0.5	-0.4	-0.1	-1.0	-0.8
% deviation from Baseline	-0.0	-0.5	-1.2	-1.9	-2.2	-2.6	-2.4
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	1.8	0.4	-0.1	4.1	2.8	1.6	0.3
Level in Policy Scenario	0.16	0.16	0.16	0.17	0.17	0.17	0.17
% change from a year ago	1.8	0.4	-0.3	4.9	2.6	0.4	-0.4
% deviation from Baseline	-0.0	0.1	-0.1	0.6	0.4	-0.7	-1.3

Table A12. Plains: Stress Measures for Baseline and Slower Money Growth

POLICY SCENARIO: 2% Slower Growth In Money	Projected Measures of Regional Financial Stress In Agriculture						
				Year			
PLAINS REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.3	1.4	1.7	1.8	2.0	2.1	2.4
% change from a year ago	28.9	10.6	17.0	11.0	5.6	9.8	12.7
Level in Policy Scenario	1.3	1.5	1.8	2.1	2.3	2.6	3.1
% change from a year ago	28.9	14.4	24.7	15.5	10.7	12.0	17.0
% deviation from Baseline	0.0	3.5	10.3	14.7	20.3	22.6	27.4
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.5	1.7	1.7	1.8	1.8	1.8	1.9
% change from a year ago	-8.8	13.5	2.3	6.2	1.9	-0.5	2.3
Level in Policy Scenario	1.5	1.7	1.7	1.8	1.8	1.9	1.9
% change from a year ago	-8.8	13.5	2.6	6.9	1.7	0.5	2.9
% deviation from Baseline	0.0	0.0	0.3	1.0	0.8	1.9	2.5
Times Interest Earned							
Level in Baseline	4.6	4.7	4.1	4.0	4.0	3.7	3.4
% change from a year ago	-32.0	3.0	-11.8	-3.0	-0.3	-7.5	-8.2
Level in Policy Scenario	4.55	4.51	3.77	3.62	3.49	3.24	2.88
% change from a year ago	-32.0	-1.0	-16.5	-4.0	-3.5	-7.1	-11.2
% deviation from Baseline	0.0	-3.9	-9.0	-9.9	-12.7	-12.3	-15.2
Debt Burden Ratio							
Level in Baseline	3.6	3.3	3.8	3.7	3.6	3.9	4.1
% change from a year ago	49.4	-6.3	13.5	-1.2	-2.9	6.2	6.1
Level in Policy Scenario	3.56	3.36	3.87	3.79	3.78	4.03	4.59
% change from a year ago	49.4	-5.7	15.2	-2.1	-0.3	6.7	13.9
% deviation from Baseline	0.0	0.6	2.1	1.2	3.9	4.4	12.1
Financial Leverage Index							
Level in Baseline	0.9	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-6.3	1.2	-3.1	0.0	0.5	-2.3	-3.1
Level in Policy Scenario	0.94	0.94	0.90	0.89	0.89	0.86	0.82
% change from a year ago	-6.3	0.1	-5.1	-0.3	-0.7	-2.8	-5.4
% deviation from Baseline	0.0	-1.1	-3.1	-3.5	-4.6	-5.2	-7.4
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	11.5	1.6	2.6	4.6	2.7	1.9	0.7
Level in Policy Scenario	0.17	0.18	0.18	0.19	0.20	0.20	0.20
% change from a year ago	11.5	1.8	2.7	5.2	3.0	0.9	1.0
% deviation from Baseline	0.0	0.1	0.2	0.7	1.0	-0.1	0.2

Table A13. Northeast: Stress Measures for Baseline and Slower Money Growth

POLICY SCENARIO: 2% Slower Growth in Money	Projected Measures of Regional Financial Stress in Agriculture						
NORTHEAST REGION	Year						
	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.7	1.7	1.9	2.0	2.1	2.2	2.5
% change from a year ago	-6.8	3.0	8.8	5.1	4.4	7.9	10.9
Level in Policy Scenario	1.7	1.8	2.0	2.2	2.4	2.7	3.0
% change from a year ago	-6.8	5.5	14.0	11.1	8.9	10.0	11.8
% deviation from Baseline	0.0	2.4	7.3	13.5	18.4	20.7	21.6
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	3.1	2.3	2.1	2.1	2.1	2.1	2.1
% change from a year ago	23.5	-26.7	-8.4	0.7	-1.0	-0.3	2.4
Level in Policy Scenario	3.1	2.3	2.1	2.1	2.1	2.1	2.2
% change from a year ago	23.5	-26.7	-8.9	0.7	-0.4	1.2	3.9
% deviation from Baseline	0.0	-0.0	-0.5	-0.6	-0.0	1.5	2.9
Times Interest Earned							
Level in Baseline	6.4	6.1	5.7	5.6	5.5	5.2	4.9
% change from a year ago	5.4	-4.9	-6.5	-1.8	-2.2	-5.4	-6.8
Level in Policy Scenario	6.4	6.0	5.4	5.1	4.9	4.6	4.3
% change from a year ago	5.4	-7.0	-9.7	-5.2	-4.2	-5.7	-6.8
% deviation from Baseline	0.0	-2.2	-5.5	-8.8	-10.7	-11.0	-11.1
Debt Burden Ratio							
Level in Baseline	1.8	2.0	2.1	2.1	2.1	2.1	2.2
% change from a year ago	-34.3	7.9	5.5	-1.4	0.2	2.6	3.7
Level in Policy Scenario	1.83	1.97	2.08	2.07	2.09	2.16	2.26
% change from a year ago	-34.3	7.4	5.7	-0.8	1.4	3.3	4.4
% deviation from Baseline	-0.0	-0.5	-0.3	0.3	1.5	2.1	2.6
Financial Leverage Index							
Level in Baseline	1.0	1.0	0.9	0.9	0.9	0.9	0.9
% change from a year ago	-3.6	-0.7	-1.2	0.1	-0.1	-1.1	-1.8
Level in Policy Scenario	0.97	0.95	0.94	0.93	0.92	0.91	0.89
% change from a year ago	-3.6	-1.1	-2.0	-0.7	-0.7	-1.6	-2.0
% deviation from Baseline	-0.0	-0.4	-1.3	-2.1	-2.6	-3.1	-3.4
Debt-to-Asset Ratio							
Level in Baseline	0.1	0.1	0.1	0.1	0.1	0.1	0.1
% change from a year ago	-24.1	2.1	1.5	3.5	2.6	1.3	-0.2
Level in Policy Scenario	0.12	0.13	0.13	0.13	0.14	0.14	0.14
% change from a year ago	-24.1	2.0	1.2	4.1	2.5	-0.1	-0.1
% deviation from Baseline	-0.0	-0.1	-0.3	0.2	0.1	-1.2	-1.2

Table A14. Corn Belt: Stress Measures for Baseline and Slower Money Growth

POLICY SCENARIO: 2% Slower Growth In Money	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
CORN BELT REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks delinquent 30 days or more (percent):							
Level in Baseline	1.0	1.0	1.1	1.2	1.2	1.3	1.5
% change from a year ago	1.0	-4.4	10.6	9.5	1.2	9.4	16.9
Level in Policy Scenario	1.0	1.0	1.1	1.2	1.4	1.7	2.2
% change from a year ago	1.0	-3.1	16.8	7.0	13.2	19.5	34.6
% deviation from Baseline	0.0	1.4	7.0	4.6	17.0	27.9	47.2
Farmers in Ag. banks' lending area who filed for bankruptcy (percent):							
Level in Baseline	1.6	1.6	1.6	1.7	1.8	1.8	1.8
% change from a year ago	-5.9	2.9	-2.4	8.0	5.1	-3.2	2.4
Level in Policy Scenario	1.6	1.6	1.6	1.7	1.7	1.7	1.8
% change from a year ago	-5.9	2.9	-2.8	8.5	-2.8	1.1	7.2
% deviation from Baseline	0.0	0.0	-0.4	0.0	-7.6	-3.5	0.9
Times Interest Earned							
Level in Baseline	4.3	4.6	4.0	3.9	4.1	3.7	3.3
% change from a year ago	-14.3	5.7	-13.0	-2.7	5.1	-8.4	-10.0
Level in Policy Scenario	4.31	4.49	3.72	3.85	3.53	3.18	2.61
% change from a year ago	-14.3	4.2	-17.2	3.5	-8.2	-10.0	-17.8
% deviation from Baseline	0.0	-1.5	-8.2	-0.2	-12.8	-14.4	-21.7
Debt Burden Ratio							
Level in Baseline	3.7	3.4	4.0	4.0	3.6	3.8	4.1
% change from a year ago	11.2	-8.5	15.7	0.1	-9.6	7.3	6.7
Level in Policy Scenario	3.66	3.40	3.98	3.51	3.67	4.05	5.15
% change from a year ago	11.2	-7.1	17.0	-11.9	4.7	10.3	27.2
% deviation from Baseline	0.0	-0.7	0.4	-11.7	2.2	5.2	25.4
Financial Leverage Index							
Level in Baseline	0.9	0.9	0.9	0.9	0.9	0.9	0.8
% change from a year ago	-4.4	1.6	-3.7	-0.2	1.9	-2.6	-4.0
Level in Policy Scenario	0.91	0.92	0.87	0.89	0.86	0.83	0.75
% change from a year ago	-4.4	1.2	-5.4	1.7	-2.6	-4.2	-9.5
% deviation from Baseline	-0.0	-0.4	-2.2	-0.3	-4.7	-8.2	-11.5
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	-1.4	0.0	2.8	3.8	0.8	2.1	0.4
Level in Policy Scenario	0.16	0.16	0.16	0.17	0.17	0.17	0.18
% change from a year ago	-1.4	-0.1	2.8	2.4	3.1	1.1	2.4
% deviation from Baseline	-0.0	-0.1	-0.1	-1.4	0.8	-0.2	1.8

Table A15. South: Stress Measures for Baseline and Slower Money Growth

POLICY SCENARIO: 2% Slower Growth In Money	Projected Measures of Regional Financial Stress in Agriculture						
				Year			
SOUTH REGION	1994	1995	1996	1997	1998	1999	2000
Farm loan volume at Ag. banks **delinquent 30 days or more (percent):**							
Level in Baseline	0.9	1.0	1.0	1.0	1.0	1.1	1.2
% change from a year ago	30.3	9.0	-1.7	2.7	3.7	4.7	8.9
Level in Policy Scenario	0.9	1.0	1.1	1.2	1.2	1.3	1.4
% change from a year ago	30.3	13.2	3.7	8.9	6.7	6.3	5.9
% deviation from Baseline	0.0	3.9	9.7	16.2	19.6	21.4	18.1
Farmers in Ag. banks' lending area **who filed for bankruptcy (percent):**							
Level in Baseline	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-2.1	-1.5	0.2	-0.5
Level in Policy Scenario	1.3	1.4	1.5	1.5	1.5	1.5	1.5
% change from a year ago	-19.1	5.9	10.8	-2.5	-1.3	0.2	0.5
% deviation from Baseline	0.0	-0.0	0.1	-0.3	-0.1	-0.1	0.9
Times Interest Earned							
Level in Baseline	8.6	8.3	8.5	8.3	8.1	7.9	7.4
% change from a year ago	-0.5	-3.6	2.1	-2.1	-2.3	-2.9	-5.6
Level in Policy Scenario	8.62	8.08	7.97	7.52	7.23	6.96	6.72
% change from a year ago	-0.5	-6.2	-1.4	-5.6	-3.8	-3.7	-3.5
% deviation from Baseline	0.0	-2.7	-6.1	-9.5	-10.9	-11.6	-9.7
Debt Burden Ratio							
Level in Baseline	1.8	1.9	1.8	1.8	1.8	1.8	1.8
% change from a year ago	9.6	6.7	-3.9	-0.6	0.5	-0.4	1.4
Level in Policy Scenario	1.77	1.89	1.81	1.80	1.81	1.81	1.81
% change from a year ago	9.6	6.8	-4.2	-0.4	0.4	0.3	-0.2
% deviation from Baseline	-0.0	0.0	-0.2	-0.0	-0.1	0.7	-0.9
Financial Leverage Index							
Level in Baseline	1.1	1.1	1.1	1.1	1.1	1.1	1.1
% change from a year ago	1.1	0.1	0.5	0.7	0.4	-0.1	-0.8
Level in Policy Scenario	1.07	1.07	1.07	1.07	1.07	1.06	1.06
% change from a year ago	1.1	-0.3	-0.1	0.2	0.1	-0.6	-0.7
% deviation from Baseline	0.0	-0.4	-0.9	-1.4	-1.7	-2.2	-2.0
Debt-to-Asset Ratio							
Level in Baseline	0.2	0.2	0.2	0.2	0.2	0.2	0.2
% change from a year ago	6.0	2.9	0.8	4.3	3.2	1.4	0.1
Level in Policy Scenario	0.17	0.18	0.18	0.19	0.19	0.19	0.19
% change from a year ago	6.0	2.9	0.5	4.9	3.0	0.1	-0.2
% deviation from Baseline	0.0	-0.0	-0.2	0.3	0.1	-1.2	-1.5

APPENDIX B

FIGURES

West Region
Past Dues
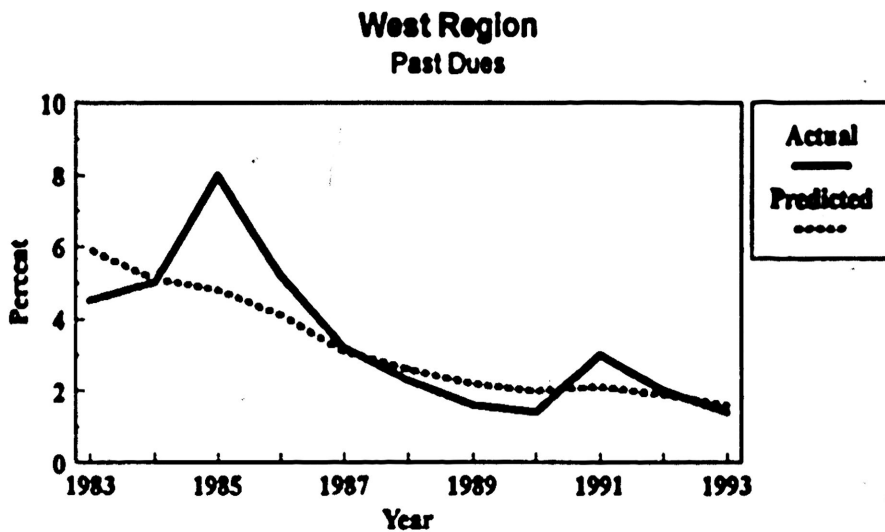
Figure B1. Comparing West Region's Actual to Predicted Past Due Loans

West Region
Bankruptcies
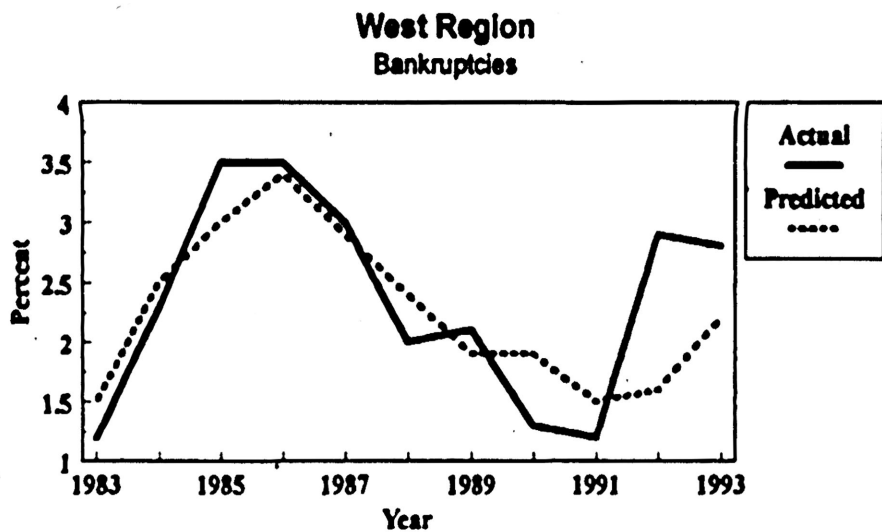
Figure B2. Comparing West Region's Actual to Predicted Bankruptcies

Plains Region
Past Dues
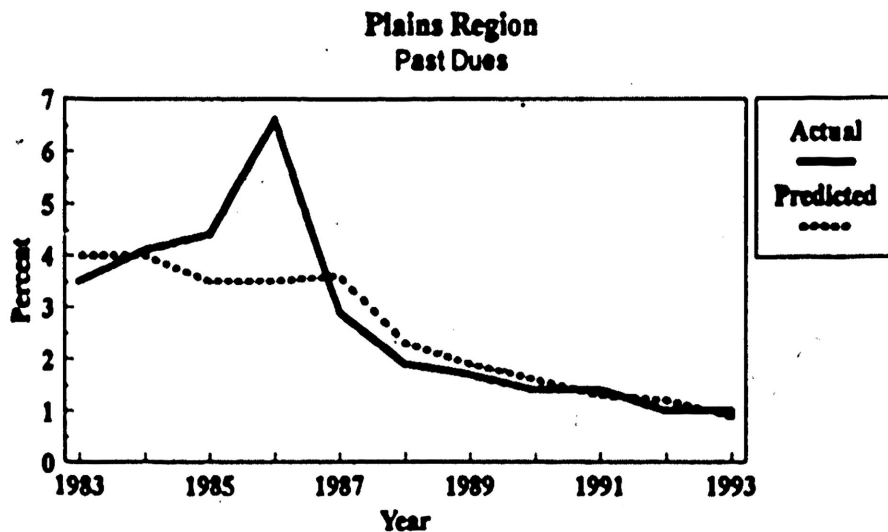
Figure B3. Comparing Plains Region's Actual to Predicted Past Due Loans

Plains Region
Bankruptcies
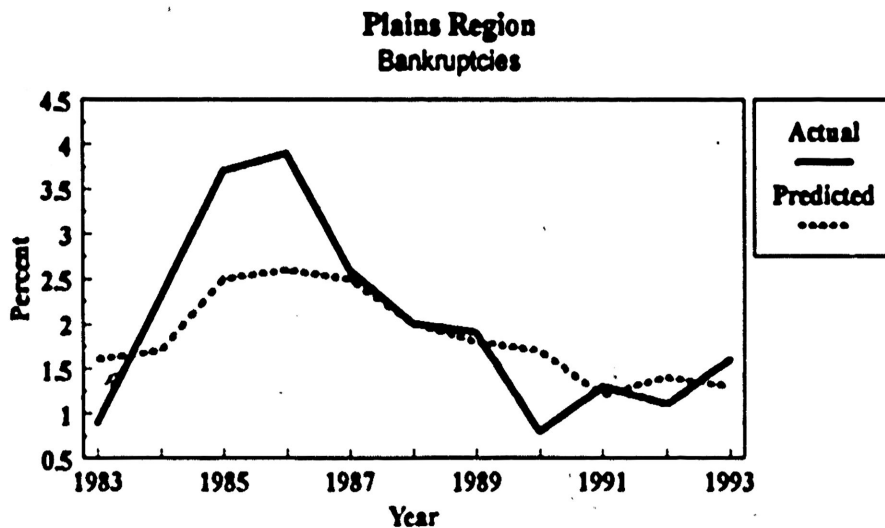
Figure B4. Comparing Plains Region's Actual to Predicted Bankruptcies

Northeast Region
Past Dues
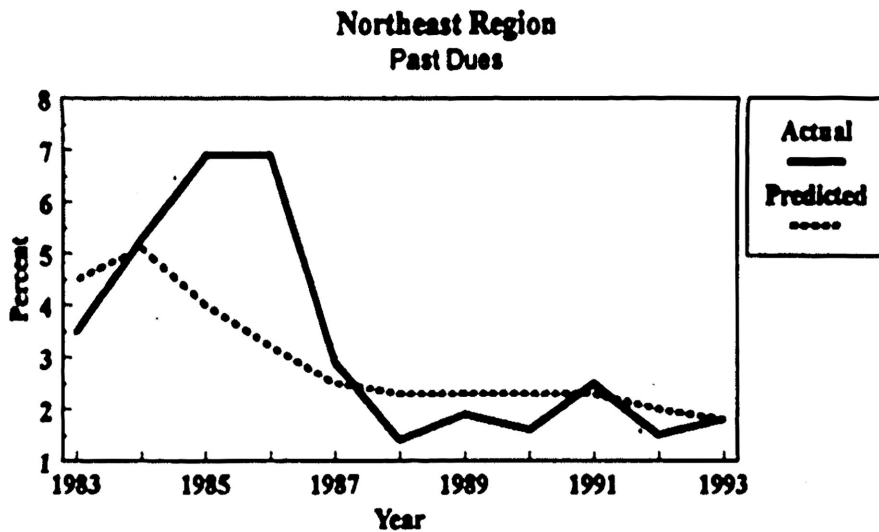
Figure B5. Comparing Northeast Region's Actual to Predicted Past Due Loans

Northeast Region
Bankruptcies
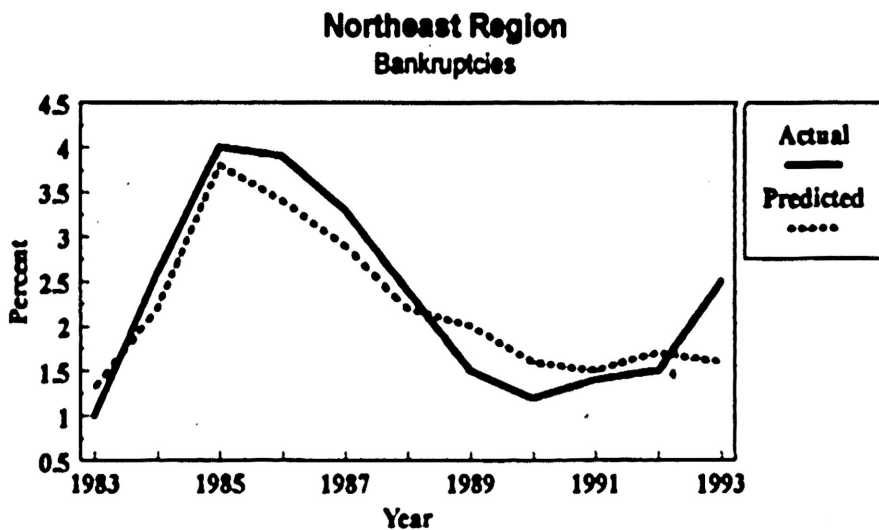
Figure B6. Comparing Northeast Region's Actual to Predicted Bankruptcies

Corn Belt Region
Past Dues
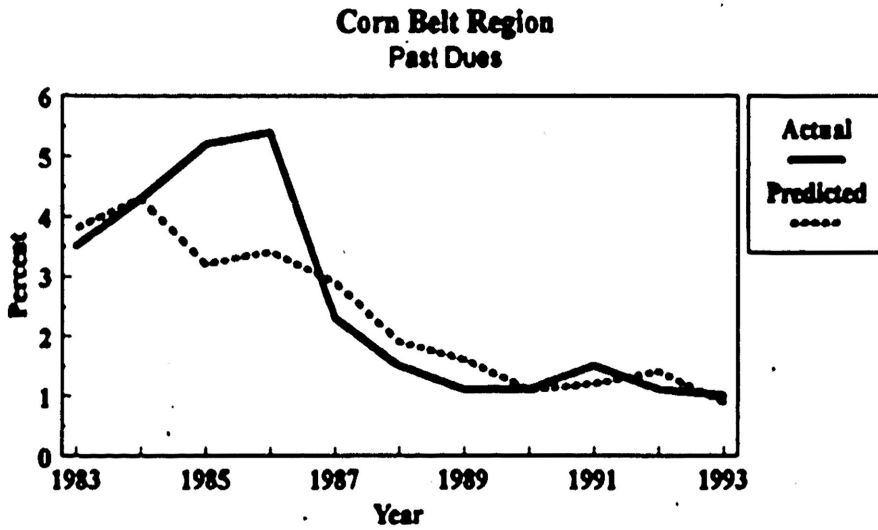
Figure B7. Comparing Corn Belt Region's Actual to Predicted Past Due Loans

Corn Belt Region
Bankruptcies
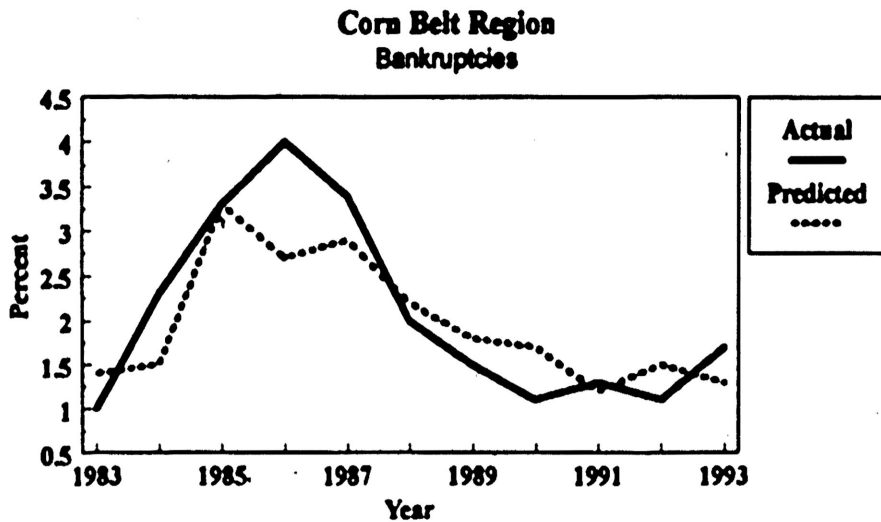
Figure B8. Comparing Corn Belt Region's Actual to Predicted Bankruptcies

South Region
Past Dues
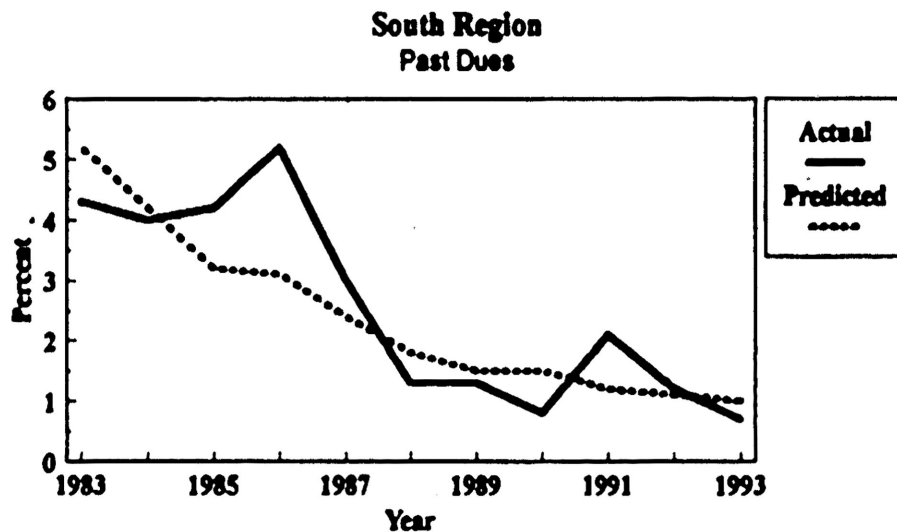
Figure B9. Comparing South Region's Actual to Predicted Past Due Loans
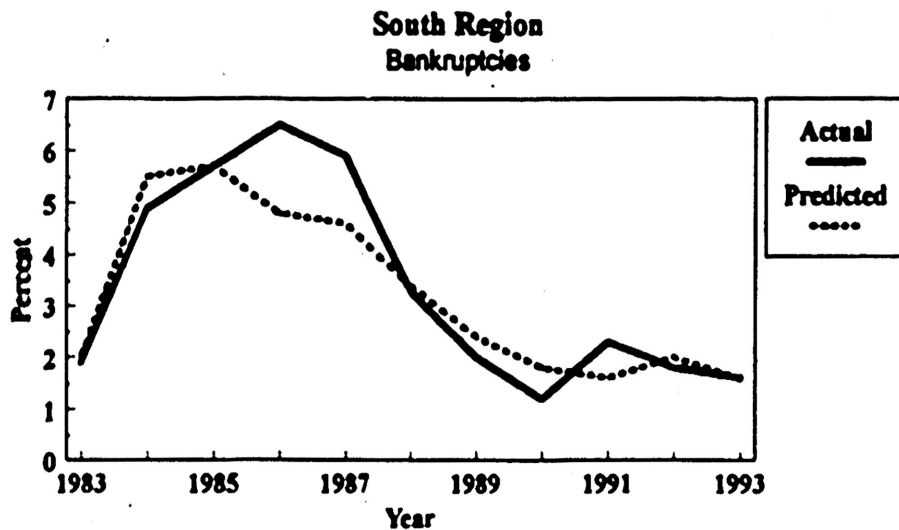
South Region
Bankruptcies

Figure B10. Comparing South Region's Actual to Predicted Bankruptcies