

The Importance of Off-Farm Income to Servicing Farm Debt

By Brian C. Briggeman

U.S. farm income is on the rise. Yet, farm income alone is often insufficient for many farmers to service their debt. In fact, for many farm operations, off-farm wages have become their main source of income. In 2008, 90 percent of all income for farm households came from off-farm activities.

This boost in income has become vital to farm households, however, it comes with significant risk. Farm operations are now exposed to economic stresses that arise outside the farm gate. In particular, rising unemployment in the local community can elevate a farmer's risk to income loss. If farmers lose this income, their financial stress would rise to the point that many would be unable to service their debt. The risk of off-farm income loss can be heightened if the local economy relies on a shrinking industry, such as manufacturing. Moreover, the financial stress associated with exposure to local unemployment levels can be much greater for some farm operations than others, depending on their size, type of enterprise, and age of the operator.

This article explores the effect of labor market stress on a farmer's ability to service debt. The first section examines the importance to

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farm operations of off-farm employment and income. The second section explains the relationship between off-farm income and a farmer's capacity to repay debt. The third section explores how a farmer's debt repayment capacity can vary with local unemployment rates. The analysis finds that financial stress among farmers intensifies as local unemployment rates rise—especially among small farmers, livestock producers, and young farmers who operate near manufacturing areas.

I. THE GROWING IMPORTANCE OF OFF-FARM INCOME

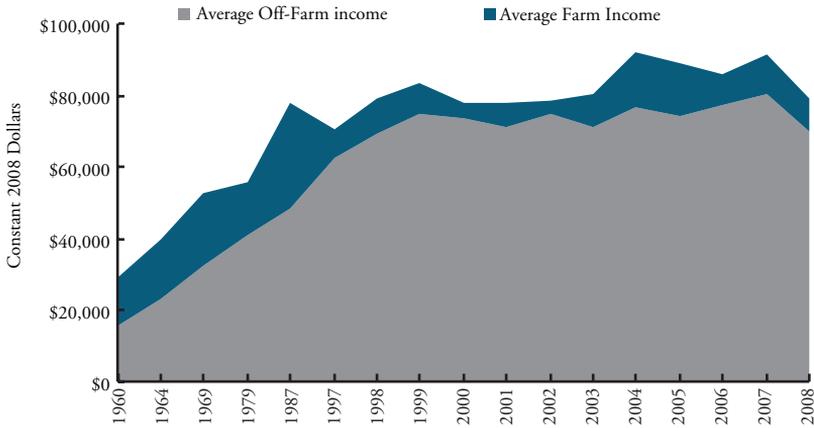
To boost income streams, farm households have steadily increased their reliance on off-farm employment. Since 1959, the fraction of farm operators and spouses who work off the farm has tripled, reaching nearly three-quarters today (USDA). As a result, off-farm employment is the primary source of income for many farm households. The extent to which producers rely on off-farm income depends on their size, type of enterprise, and age of the operator.

Farm households have increased their off-farm work primarily to boost household income (Covey and others).¹ Annual real off-farm income, as measured in 2008 constant dollars, has risen sharply over the past half-century. From 1960 to 2007, real off-farm income climbed from less than \$20,000 per year to roughly \$75,000 (Chart 1). As a result, on average, a farm household's total real income more than doubled.

While growth in off-farm income has slowed during the past decade, it still accounts for the largest portion of farm household income. In 2008, nearly all income for the average farm household came from off-farm sources (Chart 2). Working off the farm accounts for about 80 percent of off-farm income, with the remaining 20 percent coming from other off-farm sources, such as interest on bank accounts, stock dividends, and revenues from rental property.

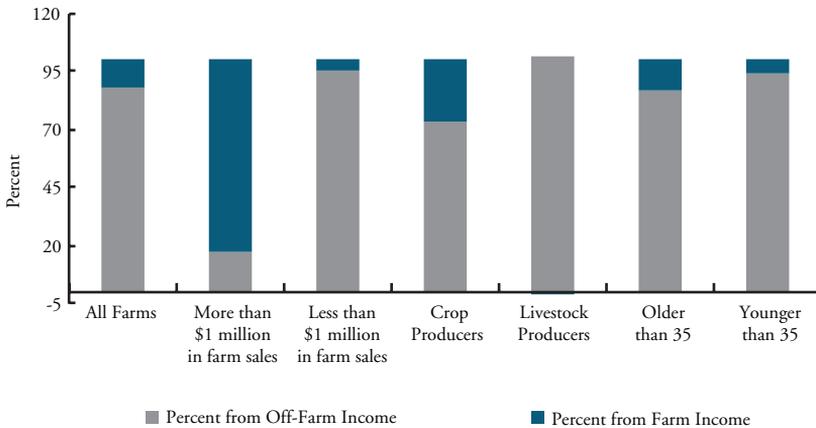
Most farms earning the bulk of their income off the farm are small operations (Chart 2). In 2008, just more than 95 percent of all U.S. farms were small (less than \$1 million in farm sales). In contrast, large farms (more than \$1 million in annual sales) earn just 20 percent of their total income off the farm. Large farms rely much less on off-farm income because they typically earn ten times more net farm income than smaller farms.

Chart 1
FARM AND OFF-FARM INCOME FOR U.S. FARM HOUSEHOLDS



Source: Census of Agriculture and Agricultural Resource Management Survey

Chart 2
PERCENTAGE OF FARM HOUSEHOLD INCOME FROM FARM AND OFF-FARM SOURCES



Source: 2008 Agricultural Resource Management Survey

Dependence on off-farm income also varies by agricultural enterprise type, especially when crop and livestock incomes move in opposite directions. In 2008, crop prices rose significantly, with prices for commodities such as corn, wheat, and soybeans reaching historic highs. Despite this rise, crop farmers still earned about 75 percent of their income from off-farm sources. At the same time, livestock producers suffered significant losses as surging feed costs slashed livestock profits. In fact, more than two-thirds of livestock operators posted *negative* net farm income, causing the average off-farm income for livestock operators to exceed 100 percent of total farm income.

The importance of off-farm income for farm households also differs for operators of different ages. Farmers younger than 35 years old are more dependent on income earned off the farm than their older counterparts. In 2008, nearly all of a young farmer's total income, 93 percent, was earned working off the farm, compared to 68 percent for farmers older than 35. Young operators depend more on off-farm income primarily because their farm income is typically one-third less than that of older operators.

II. OFF-FARM INCOME AND FARM HOUSEHOLD DEBT REPAYMENT

By supplementing their income with off-farm sources, many farmers have ample debt repayment capacity. Without off-farm income, however, most farmers would be unable to repay their debt.² This section analyzes this important relationship between off-farm income and farm debt repayment capacity.

In general, there are two ways to measure farm debt repayment capacity. The first is commonly used by agricultural lenders to gauge a farmer's creditworthiness. The term-debt and capital-lease coverage ratio can be used to determine whether a farmer can service past debt and capital lease requirements with current income.³ Most agricultural lenders use this ratio because it is recommended by the Farm Financial Standards Council (FFSC) as a straightforward way to assess borrowers' creditworthiness from their financial information (Barnard and Wilson).

A drawback of this approach is that it does not reflect current market conditions. This ratio is sensitive to unique financing terms, especially terms on loans with interest rates below current market rates. For example, farmers are often able to secure a more favorable interest rate by providing extra collateral or by having a more creditworthy

individual co-sign the loan. A lower interest rate reduces the annual term loan payment, which improves the term-debt and capital-lease coverage ratio. As a result, favorable financing terms may not reflect a farmer's actual repayment capacity under current market conditions, especially if conditions are deteriorating.

To address this shortcoming, the U.S. Department of Agriculture has developed another measure that more accurately reflects current market conditions—the debt repayment capacity utilization ratio, or DRCU. Rather than reflecting a borrower's repayment history, the DRCU reflects a farmer's potential to service debt. It divides a farmer's outstanding debt by the maximum amount of debt the farmer can afford at current market interest rates.⁴

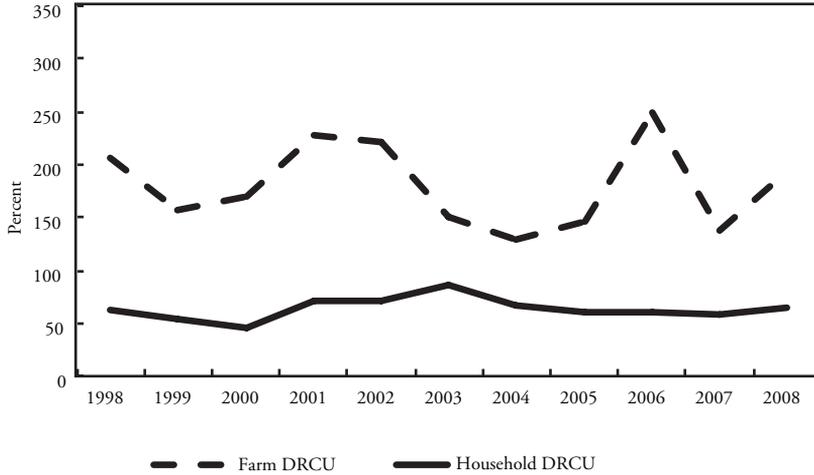
Calculating the DRCU starts by identifying the farmer's *maximum annual loan payment*. This loan payment is the annual amount a farmer has available to service a loan after all business and personal expenses and taxes have been subtracted from current farm and off-farm income.⁵ The maximum annual loan payment is then amortized at the current market interest rate and repayment term, yielding the *maximum amount of debt a farm household can afford*.⁶

The DRCU is then calculated as a ratio of a farm household's *total outstanding debt* divided by the *maximum amount of debt the farm household can afford*. Total outstanding debt must include both farm and nonfarm debt because the current income available for debt coverage includes both sources of income. In this analysis, this ratio will be referred to as the household DRCU.

Thus, the household DRCU represents the percent of a household's total debt capacity currently being used. A DRCU of 100 percent indicates that the household's total outstanding debt equals the maximum amount it can afford. For example, if the farm household had a total debt of \$550,000, and this amount was also the maximum of debt the household could afford, then the farm household would have exhausted its debt repayment capacity as its DRCU is 100 percent. A farm household with a DRCU below 100 percent could afford to carry more debt. For example, a DRCU of 50 percent indicates the household is carrying half the amount of debt it can afford. A DRCU greater than 100 percent means that the household's outstanding debt exceeds the amount it can afford, indicating financial stress.

Chart 3

FARM INCOME AND FARM HOUSEHOLD INCOME DEBT REPAYMENT CAPACITY UTILIZATION RATIO (DRCU)



Source: Agricultural Resource Management Survey

Off-farm income and debt repayment capacity

This analysis estimates two DRCU ratios. First, it calculates average *farm* DRCUs for 1998 to 2008, which excludes off-farm income and nonfarm debt.⁷ Then it calculates *household* DRCUs, which include both of these factors. Both calculations use Agricultural Resource Management Survey (ARMS) data from USDA. The ARMS data provide a broad cross-section of farm households that vary across different types of agricultural production and across regions.⁸

When considering farm income alone, most farmers would be unable to service their debt. Since 1998, the average farm DRCU never fell below 100 percent (Chart 3). In addition, the volatility of farm income and the changing levels of farm debt caused the farm DRCU to fluctuate widely. Sharp declines in farm income and rising debt in 1998, 2002, and 2006 contributed to steep increases in the farm DRCU, while rising farm income and slower debt growth in 1999, 2004, and 2007 led to steep declines.

When adding off-farm income, however, most farmers were able to service all of their debt. Since 1998, household DRCUs have con-

sistently hovered around 65 percent. Off-farm income not only makes debt more affordable, but it also reduces the volatility of farm income—and thus the volatility of the DRCU.⁹ Compared with the wide swings of the farm DRCU, the household DRCU held fairly stable, rising only modestly during the 2001 recession and the subsequent recovery, often characterized as “jobless” due to a slow rebound in employment.

Unlike most farm households, large farmers can service their debt with farm income alone. During the past decade, farming operations with more than \$1 million in sales consistently had farm DRCUs below 100 percent (Chart 4). Only in 2006 did large-farm DRCUs rise above 100 percent, as farm income dropped sharply. Even then, most large farmers were able to service their debt as their household DRCUs remained below 100 percent.

In stark contrast, farming operations with less than \$1 million in sales were rarely able to service their debt with farm income alone. From 1998 to 2008, small-farm DRCUs consistently exceeded 150 percent. Farm DRCUs were similarly high for crop and livestock producers and operators of all ages.

Once off-farm income is recognized, however, small farmers are generally able to service their debt. Their household DRCUs remained well below 100 percent over the last decade. Similar household DRCUs were found for crop and livestock producers and operators of all ages.

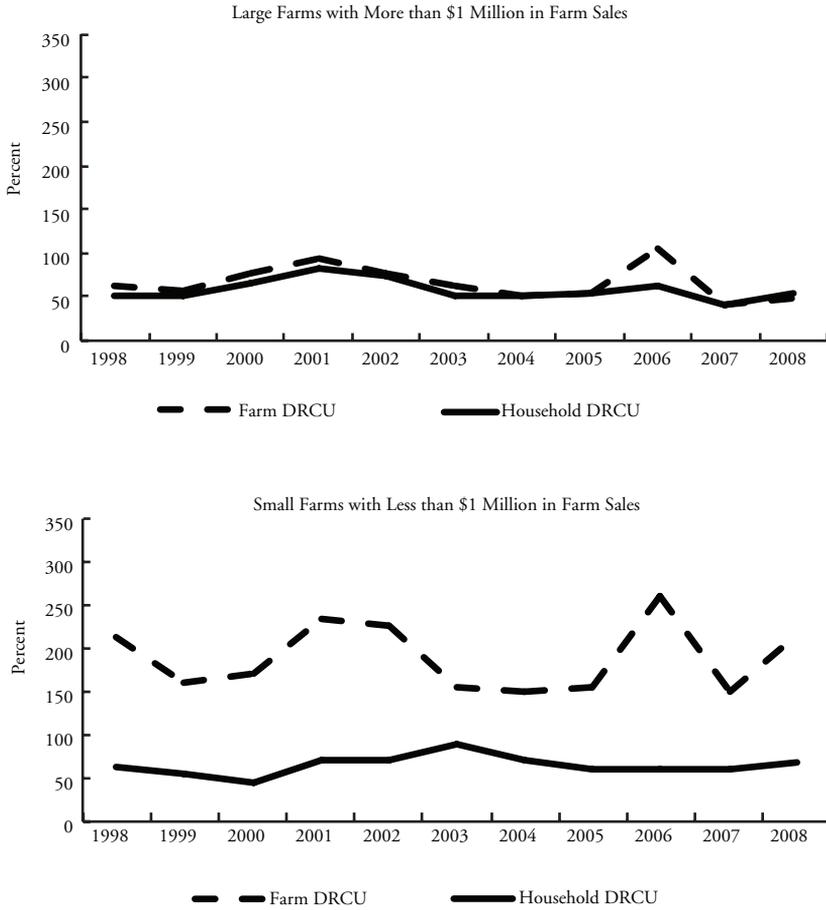
Farm households with income from off the farm consistently had lower and less variable DRCUs than farms without such income. For small-farm operations reporting some off-farm work, the household DRCU remained consistently at about 50 percent. For smaller operations not reporting off-farm work, their DRCUs were closer to 100 percent and fluctuated more widely (Chart 5).

III. UNEMPLOYMENT RATES AND DEBT REPAYMENT STRESS

Because many farm households depend on off-farm income, fluctuations in the local nonfarm economy can affect their debt repayment capacity. Deteriorating local economic conditions increase the risk that a farmer or spouse might lose his or her job, especially if the local labor market is concentrated in a sector that is shrinking. Historical relationships between the unemployment rate—an indicator of local economic

Chart 4

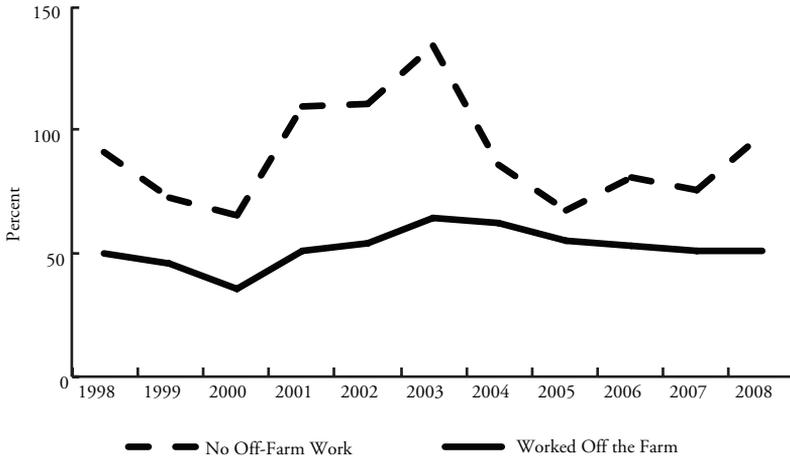
FARM INCOME AND FARM HOUSEHOLD INCOME DRCU BY SIZE OF FARM SALES



Source: Agricultural Resource Management Survey

Chart 5

HOUSEHOLD DRCU OF SMALL FARMERS



Source: Agricultural Resource Management Survey

conditions—and a farm household's DRCU suggest that farmers in rural counties with weak labor markets are at a greater risk of rising debt repayment stress than other farmers.

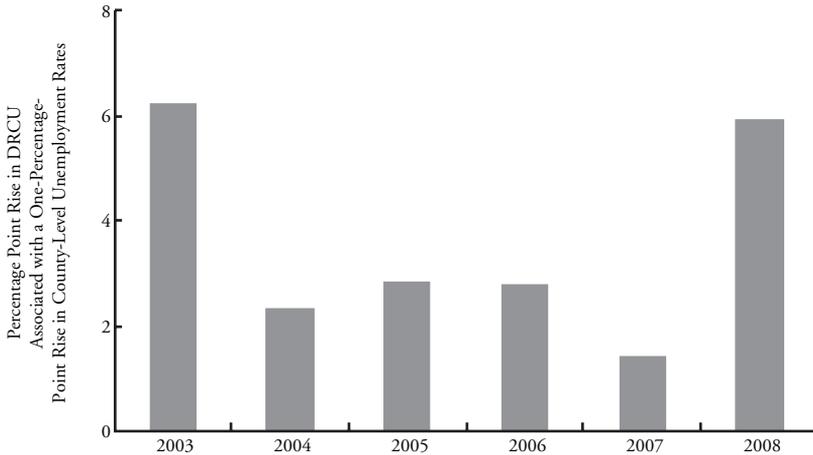
Financial stress could increase because rising unemployment rates are associated with lower farm household off-farm wages and salaries (Gould and Saupe). Chart 6 shows the relationship between the year-over-year changes in county-level unemployment rates and the household DRCUs of farmers residing in that county.¹⁰ In each year since 2003, as unemployment rates rise, DRCUs tend to increase.¹¹

Chart 6 also indicates the size of the effect of rising unemployment rates on the DRCU. For example, in 2003, a one-percentage-point increase in the county-level unemployment rate corresponded to a six-percentage-point increase in a farmer's DRCU. This effect appears to be larger during periods of labor market stress. DRCUs tended to rise twice as fast during the jobless recovery in 2003 and the recession in 2008 than when the economy was expanding between 2004 and 2007.

Even after controlling for changes in farm income and farm characteristics, DRCUs still tend to be higher in locations with elevated unemployment rates. A straightforward regression model can explore the importance of farm income and unemployment rates on debt repayment capacity. At the same time, the model can account for farm income, debt, and other farm characteristics, such as farm size and

Chart 6

RELATIONSHIP BETWEEN THE HOUSEHOLD DRCU AND COUNTY-LEVEL UNEMPLOYMENT RATES



Source: Agricultural Resource Management Survey and Bureau of Economic Analysis

Note: Estimates are slope coefficients from a regression of household DRCU on county-level unemployment rate. A one-percentage-point increase in county-level unemployment rates corresponds to the percentage-point change in DRCU shown by the bars.

geographic location.¹² The regression results confirm that a farmer's DRCU tends to rise with elevated county-level unemployment rates. Furthermore, DRCUs tend to rise more for small farms, livestock producers, and younger operators.¹³

Where is debt repayment stress highest?

Debt repayment stress could also be heightened by the structure of a local economy. In 2008, many counties had higher unemployment rates because their economic activity was concentrated in a struggling industry. Today, many of these same counties still have elevated unemployment rates. A farmer or spouse working in these counties is the most at-risk of losing an off-farm job. If these individuals were to lose their jobs, would their debt repayment stress reach critical levels?

USDA classifies counties based on economic structure.¹⁴ Service-dependent counties derive 45 percent or more of their total earnings from the service sector. Manufacturing-dependent counties derive at least 25 percent from manufacturing. The remaining counties fall into the all other category.

During the recent recession, unemployment rates rose more quickly in manufacturing areas than in service-based areas. From 2007 to 2009, the unemployment rate in manufacturing counties rose from 6 percent to more than 11 percent, compared to a rise of 5 percent to just less than 9 percent in service-dependent counties (Parker, Kusmin, and Marre). Moreover, according to 2010 Bureau of Labor and Statistics data, unemployment rates in some rural manufacturing counties, such as in the upper Midwest, remained greater than 15 percent.

The financial stress resulting from job losses by members of a farm household typically varies, depending on the local area's industry dependence. A straightforward way to illustrate this effect is to subtract the off-farm wages and salaries earned by a farmer or spouse from their total household income. For an average farm household in a manufacturing county, the loss of an off-farm job would cause the household's DRCU to rise to 150 percent, the highest DRCU for all counties considered (Chart 7). In contrast, the loss of off-farm income in a service-dependent county would move the farm household's DRCU to just 50 percent.

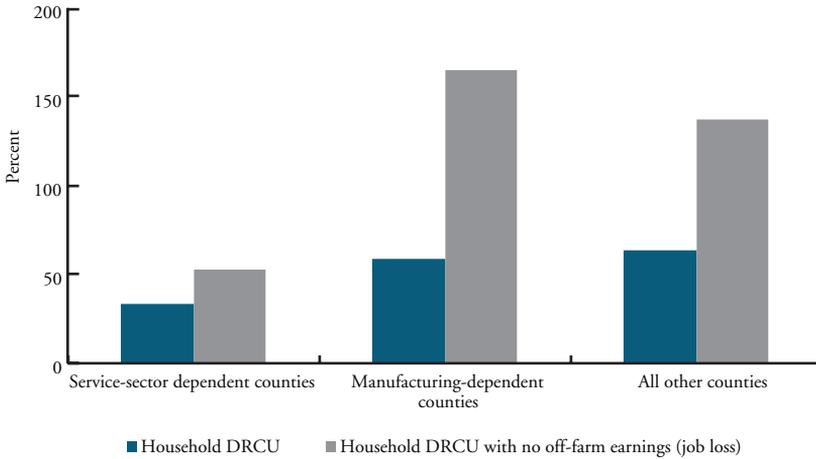
Higher DRCUs for farmers in manufacturing counties are attributable to a stronger reliance on off-farm income and their larger debt load. According to 2008 ARMS data, off-farm income represented more than 40 percent of total income for the average farm household in manufacturing counties, compared to just 30 percent in service-dependant counties. In addition, the average total debt of farmers in manufacturing counties was 45 percent higher than their service-dependent counterparts. The higher debt levels in manufacturing-dependent counties are likely due to the restructuring of rural America. According to the Bureau of Economic Analysis, since 2001 the manufacturing industry shed nearly 10 percent of its jobs in rural areas. Off-farm income for farmers in these areas likely fell as manufacturing jobs vanished. In response to falling income, farmers may have borrowed more to pay for expenses.

Whose debt repayment stress is highest?

In counties with elevated unemployment rates, farm households that rely more heavily on off-farm income are more susceptible to rising debt repayment stress. It may be possible, however, that rising farm income can stave off debt repayment stress for these households. In 2010, as well as in 2008, net farm income spiked, especially for crop

Chart 7

HOUSEHOLD DRCU OF FARMERS IN COUNTIES WITH RISING COUNTY-LEVEL UNEMPLOYMENT RATES— STRUCTURE OF LOCAL ECONOMY



Source: 2008 Agricultural Resource Management Survey

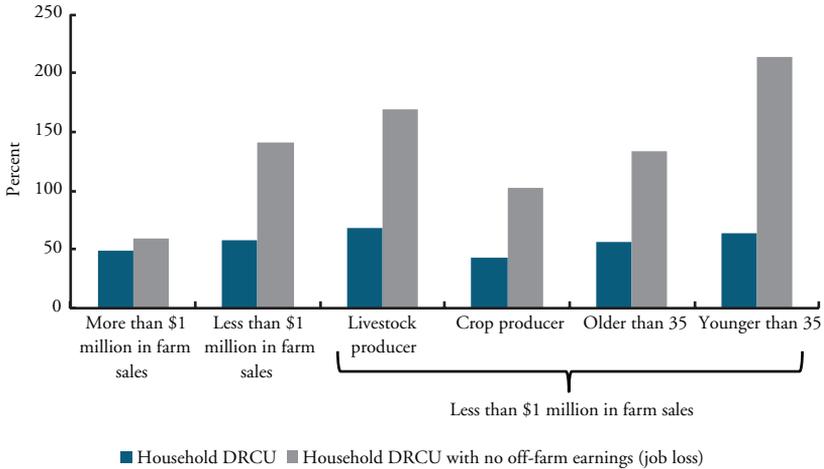
farmers. Due to the similarity of economic conditions in these two years, examining the debt repayment capacities by type of farm household—that is, by size, enterprise type, and age—could shed light on who might be experiencing debt repayment stress today.

As in 2008, the farm economy in 2010 performed well, especially for crop farmers. According to the U.S. Department of Agriculture, 2008 net farm income rose more than 20 percent from the year before, as crop prices soared to record highs. Similarly, 2010 net farm income rose 31 percent, as stronger demand and tighter supplies sent crop prices soaring.

Stronger farm income can reduce debt repayment stress brought on by the loss of a job. In 2008, large farming operations had more than enough farm income to service their debt. Thus, large farmers would experience limited debt repayment stress after a job loss. The analysis shows that if a large-farm household lost an off-farm job, the average DRCU for the household would rise only slightly above 50 percent (Chart 8). This modest effect can be explained by the 2008 ARMS data, which show that farm income for the average large-farm household was more than ten times greater than off-farm income.

Chart 8

HOUSEHOLD DRCU OF FARMERS IN COUNTIES WITH RISING COUNTY-LEVEL UNEMPLOYMENT RATES—FARM TYPE



Source: 2008 Agricultural Resource Management Survey

Another farm household type that benefited from strong farm income is crop producers, even those with less than \$1 million in sales. In 2007 and 2008, surging crop prices boosted small crop producers' farm income. With two consecutive years of 20 percent gains in income, half of small crop producers' total income in 2008 came from the farm, the highest of all small farm operators. As a result, even if small crop producers lost income from an off-farm job, the analysis shows that their average DRCU would rise to just 100 percent, indicating they would still be able to service their debt.

Nevertheless, most small farming operations need off-farm income to service their debt. For small farmers, on average, working off the farm provides half of their total income. Losing this income would send their DRCUs to 150 percent. Of these small farming operations, livestock producers and young operators are the most susceptible to debt repayment stress. In 2008, significant losses for livestock producers and lower farm income for younger operators made off-farm income even more important. Thus, job losses in 2008 would raise the DRCUs for many livestock producers and young operators as high as 170 and 215 percent, respectively.¹⁵

IV. CONCLUSIONS

Most farmers rely on off-farm income to repay their debt. As a result, stressed labor markets that elevate the risk of job and income loss could significantly reduce a farmer's ability to service debt. This relationship is strong enough that lenders could view rising unemployment rates as an indicator of financial stress that could affect a farm household's ability to repay debt.

The analysis found that farm debt repayment stress tends to rise in counties where economic activity is concentrated in a struggling industry. In manufacturing counties, where unemployment exceeded 11 percent in 2009, an average farm household losing its off-farm income would find it difficult to service its debt if a member of the household were to lose an off-farm job. In fact, the household DRCU would rise to 150 percent, the highest DRCU for all counties considered in this analysis. In contrast, the loss of off-farm income in a service-dependent county would move the farm household's DRCU to just 50 percent.

Debt repayment stress varies depending on the size, type of enterprise, and age of the operator. Most farmers with less than \$1 million in farm sales lack sufficient farm income to repay their debts—especially livestock producers and young farmers. Thus, any disruption to a small farmer's off-farm income could easily lead to rising repayment stress.

In sum, the importance of off-farm employment on a farm household's ability to repay debt should not be overlooked. Lenders often focus on farm income trends—but conditions such as labor market stress, job loss, and declining off-farm income often signal farmers' ability to service their debt. As rural Main Streets struggle to add jobs, some farmers may struggle with their financial position as well.

APPENDIX

This appendix describes data and provides more detail on the empirical analysis. The unique feature of the article is the development of county-level data from the Agricultural Resource Management Survey (ARMS) that matches county-level Bureau of Economic Analysis (BEA) data. To create representative county data, each county must have at least five observations in the ARMS data, similar to BEA guidelines.

Restricting the ARMS data to be representative of counties reduces the number of farm observations, which raises questions about the representativeness of the sample to the nation. ARMS represents the nation by sampling a broad cross section of producers as well as providing a set of weights that expands the sample to reflect national levels of production as well as financial information such as total farm debt. Before applying these weights, the 2008 ARMS, for example, sampled about 3,000 producers with debt. Of these producers, however, just less than 500 resided in a representative county.

With fewer observations, it is not appropriate to use the weights to build a nationally representative data set. However, without using the national weights, the small sample of 500 farms is similar to the larger sample across key variables. In each of the samples, the DRCU is about 70 percent; each of the five National Agricultural Statistics Service regions has roughly 20 percent of the observations; and farms with less than \$250,000 in farm sales and farms with more than \$1,000,000 farm sales represent about 50 percent and 15 percent of their sample, respectively.

The regression model uses the representative county data to analyze the relationship between a farm household's DRCU and county-level unemployment rates while controlling for county and farm characteristics. Similar to Gould and Saupe, a semilog model is estimated with the log of the farmer's household DRCU as the dependent variable. County-level independent variables are the log of the unemployment rate, percent change in per capita farm income, percent change in farm debt, and farm resource region dummy variables (base category is the West region). Farmer characteristic dummy variables control for farm sales (base category is sales greater than \$1,000,000), primary commodity produced (base category is livestock producer), operator age (base category is operator is older than 35 years old), and primary occupation (base category is operator is a part-time farmer).

The empirical model was estimated with ordinary least squares in each year from 2003 to 2008. Only 2008 results are presented because they are the most recent and the results are similar across years. Moreover, these findings may reflect today's conditions given the similarities between 2008 and 2010. Table A1 presents the regression results for 2008.

The regressions show that higher county-level unemployment rates correspond with higher household DRCUs. In fact, farmers in counties with 1 percent higher unemployment rates had 0.38 percent higher DRCUs. In addition, farmers in counties with rising farm income had lower DRCUs. Large farming operations, crop farms, and operators older than 35 tended to have lower DRCUs than their respective smaller, livestock, and younger counterparts.

Table A1

EFFECTS OF UNEMPLOYMENT RATE AND FARM CHARACTERISTICS ON THE NATURAL LOG OF THE FARM HOUSEHOLD DRCU RATIO (2008)

Explanatory Variables	Estimates
Intercept	-0.672 (0.617)
Ln(County-Level Unemployment Rate)	0.384** (0.194)
Percent Change in County-Level Per-Capita Farm Earnings	-0.204* (0.121)
Percent Change in County-Level Average Farm Household Debt	-0.0160 (0.013)
<i>Dummy Variables</i>	
Northeast Region = 1, 0 otherwise	0.032 (0.270)
South Region = 1, 0 otherwise	1.117*** (0.281)
Midwest Region = 1, 0 otherwise	0.274 (0.196)
Plains Region = 1, 0 otherwise	0.593** (0.266)
Less than \$250,000 Farm Sales = 1, 0 otherwise	0.221 (0.205)
Between \$250,000 and \$500,000 Farm Sales = 1, 0 otherwise	0.305* (0.167)
Between \$500,000 and \$1,000,000 Farm Sales = 1, 0 otherwise	0.215 (0.212)
Farm Primarily Produces Crops = 1, 0 otherwise	-0.487** (0.146)
Operator is Less than 35 Years Old = 1, 0 otherwise	0.335* (0.200)
Farmer's Primary Occupation is Farming = 1, 0 otherwise	-0.135 (0.275)
R-Squared	0.110
Observations	473

Note: Numbers in parantheses are White's heteroskedasticity corrected standard errors. Statistical significance at the 10, 5, and 1 percent level is denoted by *, **, and ***, respectively. Data source is 2008 Agricultural Resource Management Survey.

ENDNOTES

¹Covey and others found that these results held even across small and large farms.

²Zech and Pederson (2003) used regression analysis on a panel data set of Minnesota farmers to show that off-farm income is closely related to farmers' current and future creditworthiness. Numerous studies have found higher income leading to higher repayment capacity, which is a key driver in farm loan approval (including Mortensen, Watt, Leistriz (1988); Novak and LaDue (1997); Featherstone, Roessler, and Barry (2006); and Briggeman, Towe, and Morehart (2009)). Stam, et al. (2003) argues that a lender's farm loan portfolio is made more stable because farmer's off-farm income lifts debt repayment capacity.

³The term-debt and capital-lease coverage ratio is the income available to service term debt and capital leases divided by the sum of annual scheduled principal and interest payments on term debt and capital leases (Barnard and Wilson).

⁴The term debt coverage and DRCU ratios do tend to move together over time. So, if annual farm income rises or farm debt falls, each ratio indicates an improvement in a farmer's ability to repay debt. If farm conditions deteriorate, so does each ratio. Many of the assumptions and calculations are taken from the Economic Research Service of the USDA and can be found at http://www.ers.usda.gov/Briefing/farmincome/glossary/def_drcu.htm.

⁵This number follows the recommendation of the Farm Financial Standards Council. It is calculated as follows: Income for Debt Coverage from Farm and Off-farm Sources = Net Farm Income + Depreciation Expense + Interest Expense + Capital Lease Payments + Off-farm Income – Withdrawals for Family Living – Income Taxes. The USDA suggests using 80 percent of income for debt coverage to allow for a reasonable margin for capital replacement and contingencies. However, a reasonable margin is arbitrary and may vary across farms. As such, the entire amount of income for debt coverage is used in this analysis.

⁶The maximum amount of debt a farm household can afford is calculated with the following equation:

$$(1) \text{Maximum Amount of Debt a Farm Household Can Afford} = \frac{\text{Maximum Annual Loan Payment} * [1 - (1 + \text{Market Interest Rate})^{-\text{Repayment Term}}]}{\text{Market Interest Rate}}$$

For example, assume a maximum annual loan payment would be \$100,000. This loan payment is then amortized over a repayment term of seven years, which is the average length for term farm loans following USDA guidelines. The market interest rate is the intermediate term non-real-estate loan, which today is 6.5 percent, according to the Agricultural Finance Databook (more information on the databook is available at the Federal Reserve Bank of Kansas City's website, www.kansascityfed.org). Inserting these numbers into the above equation reveals that the

maximum amount of debt this farm household can afford is \$548,452 or about \$550,000.

⁷The farm DRCU also only accounts for taxes associated with farm income.

⁸ARMS is a cross-sectional survey of all types of farm households across the United States ARMS is jointly administered by the Economic Research Service and National Agricultural Statistics Service of the USDA.

⁹Research has found that farm operators were more likely to report off-farm income when farm income varied greatly (Mishra and Goodwin). Moreover, as off-farm income rose, farmers were less likely to save to offset farm income declines (Carriker, et al.).

¹⁰County-level unemployment rates from the Bureau of Labor and Statistics are matched with ARMS data to create a representative county data set. More on the implications of matching these two data sets is contained in the appendix.

¹¹To limit the impact of external forces, data from 2003 to 2008 is used to ensure only one farm policy regime is considered. Moreover, farm households with DRCUs two standard deviations above the mean DRCU are deleted.

¹²The appendix provides more detail on the regression analysis.

¹³The findings are similar to Briggeman.

¹⁴USDA identifies six county types, but due to limited data, farming, mining, and government-dependent counties are grouped with nonspecialized counties to form the other category. More information on the USDA/ERS county typology is available at: <http://www.ers.usda.gov/briefing/rurality/typology/>.

¹⁵In 2010, livestock incomes did improve, which likely eased some debt repayment stress for livestock producers.

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