

# **Using Economic Value Added (EVA) to Examine Farm Businesses**

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**Abstract**

The four profitability measures recommended by the Farm Financial Standards Task Force have limitations for examining wealth creation. Non-farm corporations, by contrast, have started to use Economic Value Added (EVA) to measure wealth creation. EVA has some advantages over other financial ratios because it fully accounts for the resources used on the farm and it includes both realized and unrealized capital gains in the calculation. This article examines the EVA metric for three years of farm financial data to determine if it provides additional information about wealth creation and profitability than do the other four ratios. Factors that help predict EVA are also examined

## **Using Economic Value Added (EVA) to Examine Farm Businesses**

Ever since the Farm Financial Standards Task Force (FFSTF) was formed, there has been a common set of financial ratios to assess farm performance. These 16 ratios fit into five categories: liquidity, solvency, profitability, repayment capacity, and financial efficiency. By defining how financial statements are created and how the financial ratios are calculated, the FFSTF has made it easier to compute the financial position of comparable farms and to assess individual farms over time.

There are limitations, however, when trying to use these ratios to measure how a farm business is contributing to a farmer's wealth. There are four profitability measures recommended by the FFSTF: Return on Assets (ROA), Return on Equity (ROE), Net Farm Income (NFI), and operating profit margin. Because ROA and ROE examine income in terms of either assets or equity, they probably come closest to measuring wealth creation. However, using these two ratios to measure wealth can be misleading because unrealized capital gains are excluded from the calculation (FFSTF). These unrealized capital gains are mainly from farmland that has appreciated. In addition, the ROA and ROE calculations give a percentage as the answer. Thus, neither of these two ratios indicates if a farmer has created wealth during the course of a year.

There are also limitations with using NFI or operating profit margin to measure wealth creation. While NFI gives a dollar amount for the answer, it does not fully account for the resources used to generate those dollars. Operating profit margin is important but it only explains half of ROA (i.e., asset turnover ratio times operating profit margin equals ROA). Therefore, another tool is needed to determine if a farmer has created economic value.

Unlike farms, corporations have been examining wealth creation for several years. This focus on value is based on Net Present Value (NPV) analysis and is partly attributable to

investor's questions about how companies are being run. There are several value-based metrics with the most common being Economic Value Added (EVA). The concept behind EVA is to maximize the return from all capital minus the cost of that capital.

Although corporations are using EVA, applications using farm level data are limited. This article examines the EVA metric for three years of farm financial data to see if it provides more information about profitability and wealth creation than does ROA, ROE and the other profitability ratios. Factors that help predict EVA are also examined.

### What is EVA

The actual calculation depends on the particular industry but in its simplest form the calculation for EVA is:

$$(1) \text{ EVA} = \text{NOPAT} - \$ \text{ Capital Charge (Fabozzi and Grant).}$$

In this formulation *NOPAT* is net operating profit after taxes, but with interest added back. The *\$ Capital Charge* is the weighted average cost of capital times the amount of capital invested (*CapInv*). The weighted average cost of capital can be defined as:

$$(2) \text{ WACC} = i_e*(E/A) + i_d*(D/A).$$

Here,  $i_e$  is the cost of equity capital and  $i_d$  is the after tax cost of debt capital.  $E$ ,  $A$ , and  $D$  represent equity, assets, and debt, respectively. The amount of capital invested is the value of all assets less non-interest bearing liabilities. Thus, EVA is calculated as:

$$(3) \text{ EVA} = \text{NOPAT} - [i_e*(E/A) + i_d*(D/A)] * \text{CapInv}.$$

EVA is measured in dollars and calculates the dollar spread between the return on invested capital and the cost of capital invested. Thus, EVA is the post-tax rate of return on invested capital minus the weighted-average cost of capital (Grant). A positive EVA indicates a company or farm has generated wealth because the assets employed have generated a return

sufficient to cover the costs of using those assets. A negative EVA indicates a company or farm is consuming assets because the returns from all assets falls short of the returns required for both debt and equity. Because the charge to equity is a non-cash charge, a company or farm can have positive net income but still have negative EVA.

Although the term “EVA” is copyrighted by Stern Stewart and Company, the concepts behind EVA are not new. The Illinois, Kentucky, Alabama, and Colorado Farm Business Analysis Programs provide their farmer clients with reports that contain a term called “return to management.” Taking net farm income and subtracting a charge for equity capital produces this return to management. Similarly, General Electric used to measure residual income in the 50’s and 60’s by allowing for capital costs (Brewer, Chandra, and Hock).

Again, EVA depends on net operating profit after taxes. To properly calculate economic profit, a variety of adjustments must be made to most financial statements. Certain expenditures such as research and development and employee training costs are capitalized and then amortized rather than expensed (Burkette and Hedley). Other adjustments include goodwill and operating leases (Mills, Rowbotham, and Robertson). Stern Stewart has identified more than 160 potential GAAP adjustments (Ehrbar). However, Stern Stewart normally uses less than 15 adjustments.

#### Comparison to other measures

EVA and NPV are very similar concepts. If the EVA measure for earnings accounts for the tax shield provided by depreciation, then there is a direct connection between EVA and NPV. Otherwise, EVA will understate the company value relative to NPV (Turvey, et al). EVA values for each future year must be discounted back to the present to give a NPV number. In effect, EVA represents the flow component of a stock measurement, which is the NPV of a firm

(Young). Shrieves and Wachowicz, Fabozzi and Grant, and Grant also show the equivalence between EVA and NPV.

One of the claims of EVA is that this metric is superior to ROA and ROE. Turvey, et al. investigates this claim by examining 17 Canadian food processing companies. They find that high EVA per share firms also have high ROA and ROE while low EVA per share firms have lower measures of profitability. Their regression results found a dollar increase in EVA per share yields a 3.5 percent increase in ROA and an 11.3 percent increase in ROE. However, the  $R^2$  was only 0.14 and 0.10, respectively, and the regression only included one year's worth of data.

Brewer, Chandra, and Hock discuss how EVA is superior to metrics such as ROI. Return on investment can encourage managers to make decisions that are in their own best interests rather than the company's best interest. If managers are judged using a hurdle rate for ROI, then projects that still add wealth may be excluded.

Despite the benefits of EVA analysis, there are three possible reasons EVA may not be used (Brewer, Chandra, and Hock). The first is size differences. Larger companies or farms could create more wealth than smaller companies or farms despite not using their assets as efficiently. Measures such as ROA and ROE do not have this problem. The second reason is that EVA is a short-term concept. Ideas that have a long-term payoff may be rejected because their future contribution may not be fully reflected in the numbers used to calculate EVA. However, this short-term orientation applies to measures such as ROA and ROE as well. Finally, EVA and other financial metrics are only guides and do not say where a problem may lie.

Several studies have examined whether EVA measures can be used for management incentives. Biddle and Wallace examine whether managers respond to EVA incentives when making operating, investing, and financial decisions. They found that using EVA does affect

management decisions. It was not clear though whether these decisions also increased shareholder value. Rogerson uses a principal-agent model to show that basing a manager's pay on rules such as EVA will eliminate moral hazard problems that exist when traditional evaluation rules are used. Rogerson's conclusion is that costs must be allocated across periods in proportion to the benefits provided and that the discounted sum of the cost allocations, using the shareholder's cost of capital, be equal to the total investment cost.

Results are somewhat mixed when assessing if EVA affects stockholder value. Earlier it was shown that discounting future EVA is equivalent to NPV. However, Biddle and Wallace found that earnings before extraordinary items better explains stock returns and firm values than does EVA. In contrast, Grant finds that high relative EVA also leads to high relative increases in market value while Machuga, Pfeiffer, and Verma find that EVA adjustments help to predict earnings per share.

There are several reasons why EVA might not always adequately explain stock value (Biddle and Wallace). First is that realized economic profit may not match what was projected. Second, the market may not be using the same capital charge as is reported in the EVA measure. Third, EVA calculations have no surprise valuation in the components such as cost of capital charges. Finally, all investors may not have access to EVA data and thus this information is not reflected in the stock price.

In summary, the advantages of using EVA to measure business health more than compensate for the known disadvantages of this measure. We address one of the weaknesses by specifically including a variable for farm size. As a financial indicator, EVA is similar to NPV analysis, yet it may be better than other ratios, especially when evaluating manager decisions. However, no previous study explains what factors might help predict EVA, particularly with

respect to farm businesses. This paper fills the aforementioned gap in the EVA literature. Specifically three years of farm financial data from the Kentucky Farm Business Management (KFBM) program is used in a regression model designed to explain what factors are important for estimating EVA. This econometric model is then used to predict ROA and ROE for the same farms.

#### Data characteristics

A Panel dataset of 102 farms for the years 1998, 1999, and 2000 is used for this study. The dataset is obtained from records of farmers in the KFBM program. This program uses area farm management specialists to obtain detailed and accurate financial information. Although the Kentucky program has over 400 farms, only those farms that had both certified income statements and balance sheets for all three years are used.

The farm operators in this study average 53.4 years of age and farm 1,067 acres. They own 291 acres, crop share 453 acres, and cash rent 323 acres. Debt-to-asset ratios average 36 percent on total assets of \$1,488,943. For the last three years, net farm income has averaged \$53,164.

Compared to state averages from Kentucky Agricultural Statistics, KFBM farms tend to be larger. The average size farm based on all farms in the state is 151 acres. For comparison, the average U.S. farm is 434 acres. The debt to asset ratio for all Kentucky farms is 15 percent with the average farm employing \$256,000 of assets. However, Kentucky Agricultural Statistics data is based on all 90,000 farms in the state. In general, these are smaller, part-time farms that do not reflect the fulltime farms in the state. KFBM data probably reflects the fulltime farms more accurately than does Kentucky Agricultural Statistics data.



The predominant responsibility of the KFBM program is to keep track of financial information. However, some production characteristics are recorded as well. The information considered for analysis in this study includes: all balance sheet and income statement information; the number of total acres, tillable acres, owned acres, crop share acres, and cash rent acres; the amount of unpaid family and operator labor; the number of household members; the date of birth of the operator; the location within Kentucky of the farm; the percent of feed fed; and the farm type.

The percent feed fed is calculated by taking the total value of feed fed to all livestock enterprises and dividing by the value of crop returns. However, tobacco revenue is excluded from crop returns for this calculation. Values for percent feed fed can range from zero to infinity. Large values are possible if a farm has limited grain production and thus purchases much of its feed. The term “percent feed fed” may also be thought of as percent crops fed since the KFBM program is really trying to measure how much of crop revenue is used to cover feed expenses.

Farms are classified by type based on the amount of feed fed to various classes of livestock relative to the value of crops produced on the farm (i.e., “percent feed fed”). Grain farms are defined as farms on which the value of feed fed was less than 40 percent of crop returns and the value of feed fed to dairy cattle was less than one-sixth of crop returns. If a farm feeds more than 40 percent of crop returns, then it is a livestock farm. Beef farms are farms where the beef enterprise utilized more than one-half of the value of feed fed. Hog farms are defined similarly to beef farms. Dairy farms are farms where the dairy enterprise utilized more than one-third of the value of feed fed.

## Model

EVA for farms in this study is calculated as:

$$(4) \text{ EVA} = \text{NOPAT} - \text{Debt CC} - \text{Equity CC} - \text{Unpaid Labor}.$$

Here, *NOPAT* is the net operating profits after taxes and is similar to the formulation in (1).

*NOPAT* can be defined as:

$$(5) \text{ NOPAT} = \text{NFI} * (1 - \text{Tax Rate}) + \text{Interest Expense}.$$

*NFI* (net farm income), and interest expense are pulled directly from KFBM income statements for each farm for each year. The tax rate is assumed to be 25 percent.

*Debt CC* is the cost in dollars of using debt capital and is defined as:

$$(6) \text{ Debt CC} = (\text{Debt Capital} - \text{Accts Payable}) * \text{Debt CCR} * (1 - \text{Tax Rate}).$$

Here, *Debt Capital* accounts for total liabilities and *Accts Payable* represents all non-interest bearing liabilities. *Debt CCR* is the rate charged against the dollars of interest bearing debt employed in the farm business. Since debt provides a tax shield, the *Debt CCR* rate is reduced by one minus the tax rate. In this study, six percent is used as the base *Debt CCR* rate. Currently, the prime rate is 4.75 percent (Federal Reserve), but historically, this rate has been higher.

Sensitivity analysis is conducted to evaluate how EVA changes in response to changes in the *Debt CCR* rate.

*Equity CC* is the cost in dollars of using equity capital and is the most difficult calculation in the formula. Because there are both depreciable and non-depreciable assets on most farms, there are two different rates for equity capital. One rate is employed for land and another for the non-land assets. Using two rates helps solve problems inherent in ROA and ROE. One of the limitations of both ROA and ROE is that capital gains (both realized and unrealized) to farmland are excluded (FFSTF). However, a large amount of the return to land is from appreciation. By

lowering the rate charged to land equity by the expected appreciation rate, this problem is minimized. *Equity CC* is thus defined as:

$$(7) \text{ Equity CC} = \text{Equity Capital} * [(\text{Land CCR} * \% \text{ Land Equity}) + (\text{Other Equity CCR} * \% \text{ Other Equity})].$$

The *% Land Equity* is defined by dividing total land value by total assets. The *% Other Equity* is the remainder of the assets. *Land CCR* and *Other Equity CCR* are the rates charged to land equity and other equity, respectively. The base rates for *Land CCR* and *Other Equity CCR* are two percent and eight percent respectively. The *Other Equity CCR* rate assumes that equity capital is riskier than debt capital since debt holders must be paid before equity holders.

The *Land CCR* rate is assumed to be six points below the *Other Equity CCR* rate because land is expected to appreciate by six percent per year. According to the USDA land survey data for Kentucky, land appreciated 6.22 percent from 1970 to 1995 and 6.75 percent from 1994 to 1998. Sensitivity analysis is again employed on both the *Land CCR* and the *Other Equity CCR* rates. The combination of land and other equity gives a weighted cost of equity capital.

The last term in equation (4) is unpaid labor. This term accounts for both unpaid family and operator labor. Unpaid labor is based on a charge assigned by the KFBM program. The KFBM program uses a set charge per month of labor so farms could have different charges for unpaid labor if the number of months of labor varies.

The parameter values of equation (8) were estimated using the regression procedure of SAS. The econometric model estimated in this investigation is:

$$(8) \text{ EVA}_i = b_0 + b_1\%OL + b_2\%CRL + b_3\%CGR + b_4\%LGR + b_5\%GGR + b_6\%LtoA + b_7\%DtoA + b_8\%DGR + b_9\%FF + b_{10}Fsize + b_{11}Age + b_{12}t2y2 + b_{13}t2y3 + b_{14}t6y1 + b_{15}t6y2 + b_{16}t6y3 + b_{17}tdy1 + b_{18}tdy2 + b_{19}tdy3$$

In equation (8),  $\%OL$  and  $\%CRL$  represent the percentage of total farm acres that are owned and cash rented, respectively.  $\%CGR$ ,  $\%LGR$ ,  $\%GGR$ , and  $\%DGR$  are the crop revenue, livestock revenue, government payment revenue, and debt as a percentage of the value of farm production. Value of farm production can also be thought of as the farm produced gross revenue.  $\%LtoA$  and  $\%DtoA$  are the percentage of land value to total assets and the percentage of debt to total assets.  $\%FF$  is the percent feed fed and is the ratio of the value of livestock feed to crop revenue.  $Fsize$  is the total number of acres on the farm and  $Age$  is the operator age as of 2000. These first 11 variables are continuous within their relevant range.

The remaining 8 variables are dichotomous (0 or 1) and they represent different farm types in different years. Specifically, the variables  $t2$  and  $t6$  represent crop and dairy farms as defined earlier. The variable  $td$  represents farms that changed type from livestock to grain during the period investigated. The variables  $y1$ ,  $y2$ , and  $y3$  represent the three years of data included in this analysis (1998, 1999, and 2000). Thus, the variable  $t2y2$ , for example, is an interaction term that is the product of  $t2$  and  $y2$ . In other words, 1999 grain farms.

The structure of equation (8) is that of a fixed effects model where the time related influences are captured (or fixed) for the three groups of producers (i.e., grain, dairy, and mixed producers). With the fixed effects model it is assumed that the errors are homoskedastic and non-autocorrelated across farm types and time periods. The limitation of the fixed effects model is that out of sample predictions are not valid.

Predicting the signs of the variables is not as straightforward as it might be for an accounting profit model. Because both equity and non-equity capital have a cost in this EVA model, the affects of different capital structures on EVA are less clear. Thus, the expected signs for most of the variables cannot be reliably predicted. However, given that we are using a higher

equity than debt charge, debt capital might actually benefit EVA. In addition, debt as a percentage of gross revenue or VFP is almost certainly a negative in the model.

## Results

The data used to estimate equation (8) were tested for several economic violations including multicollinearity, infinite error variance, heteroskedasticity, and autocorrelation. The data did exhibit infinite error variance that arises from influential observations and outliers. Several techniques were used to address the infinite error variance problem; unfortunately only deletion of key observations corrected the problem. Of 306 observations available for analysis, 262 observations were used in this analysis. The consequence of this action was that two farm types (*t1*, swine producers and *t7*, beef producers) were dropped from the analysis. These two farm types represent 18 of 44 dropped observations.

Table 1 lists the correlation coefficients of the five profitability measures examined in this study. As might be expected, there is a positive correlation among all five of the measures. Of these measures, ROA has more high correlations than do the other metrics. ROA has a correlation of 0.7 or higher with operating profit margin, net farm income, and EVA. By contrast, ROE has the lowest correlations with the other measures. All the ROE correlations are below 0.24.

The lower correlation for ROE can probably be explained by examining what each measure is trying to accomplish. ROE is only measuring returns to equity while the other measures are basically including returns to all assets.

EVA does appear to offer some additional insights into farm profitability based on the correlation matrix. Although EVA has a correlation around 0.7 for NFI and ROA, there is still some variability. In addition, the correlation between EVA and ROE is the lowest in the table.

Table 2 reports the results of the regression model used to predict EVA. This model captures 45 percent of the variations in EVA (a vast improvement over Turvey et. al). Not counting the dummy variables, five of the independent variables are significant at either a 1%, 5%, or 10% level.

The percent of government revenue as a proportion of value of farm production is significant at the 1% level. This variable has a negative sign which might seem counter intuitive given the large reliance on government payments for most farms. However, this is government revenue as a percentage of farm produced revenue. Thus, farmers who are improving the economic value of their farms find ways to increase their farm revenue beyond just the government payments.

The debt to asset ratio is significant at the 10% level and is positive indicating that as farmers increase their debt percentage, EVA increases. Because EVA uses a charge for equity capital, this result is entirely plausible. This suggests farmers might be better off with some of their equity in assets outside the farm. However, this result might also say something about the farm type and the operator. Younger farmers, for example, are more likely to have debt but may also be more willing to experiment or do other things to help increase profits. Farmers with more debt also need more money to cover the debt expense. The economic charge to equity capital is hidden in that no money actually changes hands.

The age variable is significant at the 1% level and is negative. Age is correlated with not only the amount of debt employed but also a farmer's risk preferences. As farmers age, they become more risk averse and also tend to pay down debt. Therefore, they are less willing to try production techniques and marketing practices that may be riskier, but have greater returns. In addition, an older farmer may be more willing to assume a lower charge for their equity capital.

The debt as a percent of the value of farm production is negative and is the most significant variable in the model. Unlike the debt to asset variable, debt appears here to be troublesome to farmers. However, this variable is similar to the percent of government revenue. When farmers use too much in debt relative to their farm produced revenues, they will lower their farm's economic value. Debt capital is probably fine as long as the assets purchased with the debt capital provide adequate farm revenue.

The feed fed percentage is significant at the 10% level. However, the parameter estimate is so small that the variable has a minimal effect in the model. Thus, whether farmers buy or produce their own feed makes little difference to the economic value of the farm.

The dichotomous (or dummy) variable for the farm type, time period interaction indicates the mean level of EVA from a base type and time period provided the relevant parameter estimate is statistically different from zero. The "base" farm type and time period is  $t2y1$ , which represents grain farms in the first year (1998). This variable is not included in the regression (see equation 8) to avoid perfect collinearity with the intercept, but the impact of the variable is captured in the intercept term. The parameter estimate of the intercept term (48,266) is not statistically different from zero ( $\alpha=0.05$ ). Thus, the parameter estimate of the remaining dummy variables measure changes in mean EVA from 0.

Results indicate that the parameter estimates on  $tdy1$  and  $tdy2$  are not statistically different from zero ( $\alpha=0.05$ ). Thus, they are not different from the intercept. The remaining dummy variables ( $t2y2$ ,  $t2y3$ ,  $t6y1$ ,  $t6y3$ , and  $tdy3$ ) have positive parameter estimates that are statistically different from zero ( $\alpha=0.05$ ). However, F-test results indicate that these six dummy variables are not statistically different from one another ( $\alpha=0.05$ ) except for  $t2y2$ .

Interpreting these dummy variables means that a grain farm in 1999 is associated with a mean EVA of 28,917 relative to that same farm in 1998. That same grain farm in 2000 has an EVA of 59,783 relative to 1998. Furthermore, dairy producers increased their mean EVA over 50,000 relative to the 1998 grain producer. The remaining dummy variables can be similarly interpreted.

Running the same model used to predict EVA against ROA and ROE confirms the correlation results. The model predicts ROA with nearly as accurately as it did for EVA. In addition, the same variables were significant. However, when predicting ROE, the results were much worse with an adjusted  $R^2$  below 0.10.

Figures 1, 2, and 3 show how the EVA varies by farm type and by year for different costs of capital. Figure 1 shows the base case used in the regression analysis. In this figure, debt capital is charged a six percent rate, land equity is charged at a two percent rate, and non-land equity is charged at an eight percent rate.

As Figure 1 indicates, the farm type and year makes a big difference in the EVA number. Dairy farms usually did the best while beef farms did the worst. Dairy farms had similar EVA numbers in 1998 and 1999, but declined slightly in 2000. Both grain and hog farms improved dramatically over the three years. Hog farms improved because of the change in prices while grain farms improved because of better weather conditions and more government payments due to better yields and thus more in loan deficiency payments.

Changing the rates charged to the various classes of capital did have some effects of the EVA results. Figure 2 represents very minimal capital charges with debt and other equity only being charged a six percent rate. Land equity is not being charged in this figure. Figure 3 has the same charges to debt and non-land equity as does Figure 2. However, in Figure 3, the land equity



charge is raised to four percent. As figures 2 and 3 illustrate, the charge to land equity had the biggest effect on the farms requiring the most land. Hog farms show little effect from raising the land charge while the other three types have lower EVA. Beef farms especially react to the change in land equity charge.

### Conclusions

The objectives of this study were to determine if EVA is a better measure of farm profitability and to determine what factors were important in explaining variation in farm EVA. As the correlation matrix shows, there is additional information in the EVA metric that neither ROA nor ROE is providing. Because EVA is a dollar amount, the result is easier to interpret than either ROA or ROE and it also provides an answer than can be interpreted similarly to net present value.

Calculating EVA may be more complicated than the other profitability measures. Information about how equity is divided among land and other assets is needed along with the appropriate rate to charge capital. However, detailed financial records should provide these numbers except for what capital charge rate to use. Because of the importance of these assumptions, the capital rates should be clearly stated. Then, making the calculation is fairly straightforward as demonstrated in equation (7). The only real downside to EVA is that comparisons between different size farms may be misleading. However, by grouping farms into type and size categories, this limitation is minimized.

Predicting both ROA and EVA is fairly reliable using other financial information. Especially important as predictors are government revenue as a percentage of farm produced revenue and debt as a percent of farm produced revenue. Age is the only non-financial variable that is significant at the one percent level. The problem with using financial data to predict EVA

is that it still may be difficult to explain why government revenue and debt are a low proportion of farm produced revenue for high EVA farms. However, at least a farmer has a better idea of what to examine on his or her farm.

A discouraging aspect of these three-year results is the low EVA numbers for most farm types. In order for there to be positive EVA results, most of the capital charges have to be fairly small. These seem to indicate that farmers are willing to accept lower rate of return to equity capital than they should. However, the model does not fully account for all land appreciation. Thus, lower EVA numbers are to be somewhat expected. Still, for these three years, the numbers are not where they should be. Especially troublesome are the beef farms with nearly the lowest EVA in each year.

This study provides insights into the EVA metric, but there needs to be additional work. Certainly a longer historical record and more production data would help explain EVA. Because there are no farm level studies of EVA, this paper does make a contribution to the literature. One of the most important areas to examine in future work is why farm EVA numbers are low. Are these three years atypical? Would a different metric account for all the land appreciation? Does the correlation between farm and non-farm assets explain the low farm EVA?

Table 1. Correlation Coefficients for the 5 Profitability Measures

<b>Profitability Measurement</b>	<b>EVA</b>	<b>ROA</b>	<b>ROE</b>	<b>NFI</b>	<b>Operating Profit Margin</b>
<b>Operating Profit Margin</b>	0.5521	0.7681	0.1528	0.6540	1.0000
<b>NFI</b>	0.7098	0.7434	0.1438	1.0000	
<b>ROE</b>	0.1308	0.2332	1.0000		
<b>ROA</b>	0.6986	1.0000			
<b>EVA</b>	1.0000				

Table 2. Regression Results for Predicting EVA

<b>Variable</b>	<b>Parameter Estimate</b>	<b>Standard Error</b>	<b>t Value</b>	<b>Pr &gt;  t </b>
<b>Intercept</b>	48,266	31,162	1.59	0.1127
<b>% Owned (%OL)</b>	-4,308	16,598	-0.26	0.7954
<b>% Cash rent (%CRL)</b>	-1,426	9,370	-0.15	0.8791
<b>% Crop revenue (%CGR)</b>	-2,658	20,521	-0.13	0.8970
<b>% Livestock revenue (%LGR)</b>	-1,895	20,103	-0.09	0.9250
<b>% Govt revenue (%GGR)</b>	-146,592	43,052	-3.40	0.0008***
<b>Land to assets (%LtoA)</b>	5,559	19,085	0.29	0.7711
<b>Debt to assets (%DtoA)</b>	30,932	11,201	2.76	0.0062***
<b>% Debt to VFP (%DGR)</b>	-406899	54,089	-7.52	<.0001***
<b>% Feed fed (%FF)</b>	-187	98	-1.90	0.0590*
<b>Farm size (Fsize)</b>	-688	2,264	-0.30	0.7617
<b>Age</b>	-1009	287	-3.52	0.0005***
<b>Grain – Year 2 (t2y2)</b>	28,917	7,204	4.01	<.0001***
<b>Grain – Year 3 (t2y3)</b>	59,783	7,469	8.00	<.0001***
<b>Dairy – Year 1 (t6y1)</b>	54,641	21,357	2.56	0.0111**
<b>Dairy – Year 2 (t6y2)</b>	55,320	21,541	2.57	0.0108**
<b>Dairy – Year 3 (t6y3)</b>	61,804	20,903	2.96	0.0034***
<b>Mixed – Year 1 (tdy1)</b>	26,040	25,759	1.01	0.3131
<b>Mixed – Year 2 (tdy2)</b>	9,555	26,604	0.36	0.7198
<b>Mixed – Year 3 (tdy3)</b>	52,772	18,199	2.90	0.0041***
Adjusted R-sq	0.4517			

Note: Single, double, and triple asterisks (\*) denote significance at the 10%, 5%, and 1% levels, respectively.

Figure1. EVA by Farm Type and Year: Debt = 6%, Land = 2%, Other = 8%

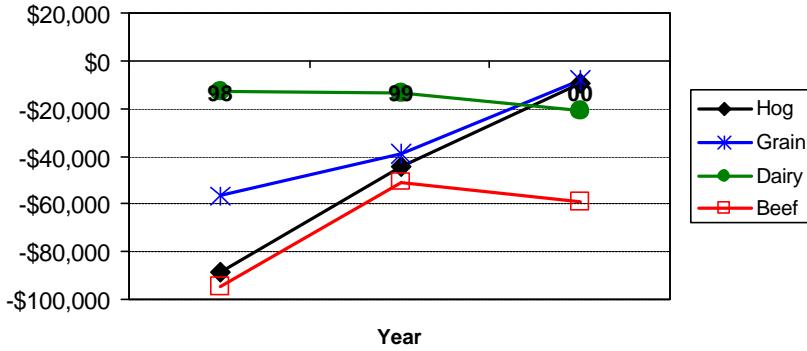


Figure2. EVA by Farm Type and Year: Debt = 6%, Land = 0%, Other = 6%

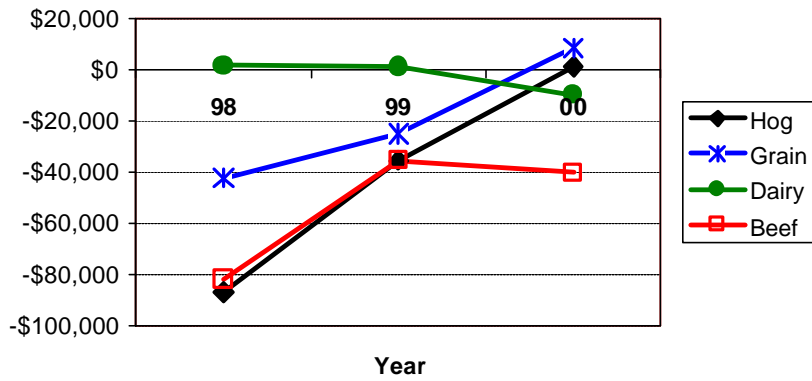
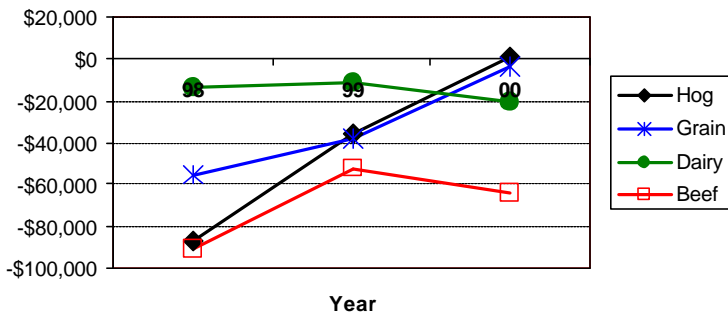


Figure 3. EVA by Farm Type and Year: Debt = 6%, Land = 4%, Other = 6%



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