Analyzing Your Business: How do you know where you stand?

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Analyzing Your Business: What do you need to know?

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Economists generally refer to the agriculture industry as being a "competitive industry." One characteristic of a competitive industry is that there are a large number of producers acting as price takers (inputs and outputs) because individual producers do not have sufficient power to influence prices.[1] Another characteristic of a competitive industry is that average profits, after all resources have been compensated, are equal to zero in the long run. Research examining the profitability of production agriculture (crop and livestock) generally reinforces the fact that long-run average returns are close to zero or possibly even negative. Custom operation businesses represent a subset of the larger agriculture industry and this segment of the industry is likely as competitive as the crop and livestock production sectors. Thus, much of the research and information gleaned from production agriculture, where data tend to be more readily available, should have relevance for custom operation businesses.

Variability in Management Abilities

The textbook definition of zero economic profits in the long run is fairly intuitive and easy to accept. For example, if profits are positive, people will enter the industry, thus driving up costs as they bid for limited resources, such as land, which would ultimately drive profits back down. Likewise, if profits are negative, people will leave the industry, decreasing the demand for inputs, hence reducing costs, ultimately leading to average profits equilibrating at zero. While this is what we might expect from a theoretical textbook point of view, what we observe in real life is rarely so simple. One thing we do know is that there are fewer farmers today than there were 50, 20, and even 5 years ago, implying that the "long run" is a long time coming, and hence we probably are not merely fluctuating around some equilibrium. Rather, there might be long run underlying trends instead. In other words, it may be that technological advancements continue to redefine the industry and thus we never "reach" the long run. Regardless, the main point is that history has shown that simply being an average producer, in terms of economic returns, is likely not sustainable for multiple generations. Further, the "average" is a moving target – as below average people go out of business the bar continually raises. This implies that in a competitive industry it is important to strive to be better than the average. However, by definition, it is impossible for everybody in an industry to be better than average and hence competition exists.

In order to strive to be "better than average" at some particular measure, say cost per acre, you obviously have to know what the average is, as well as what your cost per acre is. Benchmarking is the term typically used to refer to comparing oneself to an average. However, it should be noted that there are two forms of benchmarking that are important. External benchmarking refers to how your business is doing relative to your competitors – i.e., am I better than average? Internal benchmarking refers to how your business is doing over time – i.e., am I improving in key areas? Without some type of benchmarking, it is very difficult for a business to know how it will fare in the future. That is, some type of benchmarking is needed so managers can identify potential weaknesses in their businesses that need to be addressed and also the strengths they have to capitalize on. Businesses generally fail to adequately benchmark for one of two reasons: (1) they don't know their own information (e.g., costs) or

[1] It should be noted that "large" only needs to be enough firms to ensure that competition exists, either through direct competition or through the perception that it could exist.

(2) they don't know what the relevant averages (benchmarks) are. The first reason is an internal management decision (i.e., I'm going to keep records or I'm not), but the second reason is often out of the manager's control because the data simply may not be available. External benchmarking generally is not too difficult for traditional crop and livestock industries, as average cost and return data are often reported by various sources (e.g., universities, private businesses, USDA). Unfortunately this is not the case for custom operation businesses, where publicly reported industry data are much less readily available. Custom operators need to avoid using this as an excuse not to do some type of external bencharking though because "operating as an island" can be dangerous for long-term business survival. However, as previously stated, it may be that custom operation businesses still can benefit from examining farm-level data since their businesses share some commonalities.

Economists have long reported that large differences between high and low profit farms exist. For example, in addition to averages, the Kansas Farm Management Association (KFMA) has reported net farm income by quartile (e.g., high 25%, low 25%) for well over 50 years. Recently, KFMA Enterprise Reports have been sorted into high, middle, and low profitability groupings (Albright; Dhuyvetter and Kastens). Other states conduct similar analyses that tend to show very consistent results (e.g., Lattz; Nebraska Farm Business Association; Center for Farm Financial Management). That is, there is a significant difference in profitability, often well in excess of $50 per acre, between the high and low profit farms (generally grouped by thirds or quartiles). This suggests that some producers clearly have an economic advantage over others and they indeed may have positive profits in the long run even though the industry as a whole may not. Because custom operators' businesses have many similarities with farms (differences exist as well), it is likely that there are large differences between high and low profit custom operators.

Studies of Profitability Differences for Farms

A weakness of many of the high profit versus low profit comparisons is that they typically are based on only one year of data and weather can have a huge impact on the relative profitability across producers in any given year. For example, Beaton, Dhuyvetter, and Albright found that high profit farms had the highest crop yield in 10 of 10 crop enterprises analyzed for the year 2000. However, they also found that the most profitable third of farms also had the lowest average total costs for 9 of the 10 crop enterprises analyzed. For these nine enterprises, differences between machinery and labor costs accounted for roughly two-thirds (65.5%) of the total cost differences between the high and low profit farms. Thus, factors less dependent on weather than yields, those that are more management related, also appear to be important. In other words, while analyses of the variability of profits based on one year of data are suspect because of weather affects on yields (high profit farms one year are not exactly the same farms in the high profit category the next year), they generally hint at the importance of cost control as well. A question that needs to be answered is, Are differences between high and low profit farms due to management or more due to random events (e.g., weather)?

In order to determine if profitability differences between high- and low-profit farms is management related or simply random, a longer term analysis is required. In an analysis of approximately 1,000 farms over a 10-year time period (1994-2003), Kastens and Dhuyvetter (2004a) examined the persistence of management traits and their impact on profitability using whole-farm KFMA data.[2] Specifically, they examined whether some producers could consistently make greater profits than similarly structured neighboring farms. Because external macroeconomic factors, such as prices, often

[2] For a detailed description of their analysis methodology see Nivens, Kastens, and Dhuyvetter.

affect an entire industry, it is important to compare profits relative to other industry participants as opposed to profits in absolute levels. Thus, even during especially good or especially bad times for the industry as a whole, individual management differences can still be identified. Furthermore, because random, localized events, such as weather, often mask differences or similarities in management, it is important to observe profit differences among farms where those differences persist over time (e.g., 10 years). Factors included in their analysis were profits, yields, costs, prices, less-till adoption, planting intensity, percent of crop acres rented, government payments, and farm size. To determine if persistence exists, each of the management measures' annual values for a farm were averaged over the 1994-2003 period and then this average was tested to see if it was statistically different from 0 (from the average or typical farm). As expected, farm size and percent of crop acres rented were the most persistent variables – i.e., farm size and method of land ownership generally do not change much from year to year. Of the more "manageable" factors, the most persistent were technology adoption (planting intensity and using less tillage), followed by cost, and then profitability. Yield was less persistent and the least persistent management trait, with regards to producers being able to differentiate themselves from their neighbors, was price. That producers cannot differentiate themselves from other producers with regards to price is not surprising given that similar results have been found for professional marketing advisory services (Irwin, Martines-Filho, and Good).

Figure 1 shows the average difference in profit per acre for producers being in the top-third compared to being average for of each of the management traits in the Kastens and Dhuyvetter study. Farmers that rent more land than their neighbors are considerably more profitable than those owning land.[3] Producers that were in the top 1/3 with regards to technology adoption and cost control also were significantly more profitable than the average producer. Management traits that had a much smaller impact on profitability were yield and price – the same traits that tended to be the least persistent. Thus, based on this relatively long-term study (10 years) with almost 1,000 producers included, it appears that producers should focus their management efforts on costs and technology factors more so than marketing.

A study was conducted at Illinois (Schnitkey, 2001a) to determine if some farms consistently have higher profits than others (Figure 2). This six-year study found similar results as Kastens and Dhuyvetter in that costs differences were important in explaining profitability differences between the high- and low-profit groups and price was not important. Dhuyvetter and Kastens used enterprise-level data for Kansas crops from 2001-2003 and found that there were large differences in profitability between the top 1/3 and the bottom 1/3 of producers. Similar to Schnitkey, they found that cost differences was the most important factor explaining profitability differences, followed by yields, and price did not matter with the exception of the alfalfa enterprise (Figure 3). The fact that price was important for alfalfa and not the other crops is not particularly surprising given that alfalfa has some distinct differences – quality is more variable and market information is less common. The analogy of this result for custom operators is that rates charged for common operations (e.g., planting, fertilizer application, silage harvesting) likely vary little between custom operators, but for those less common operations it may be possible to charge different rates – i.e., by differentiating your service from others you may also be able to differentiate what you charge. Of course it goes without saying that the higher (lower) cost of differentiating your service from others has to be less than the increased (decreased) rate you charge.

[3] It is recommended that land ownership should be considered as a separate enterprise from farming. Long run returns to land ownership (rents plus capital gains) have been quite respectable (Kastens and Dhuyvetter, 2004b).

Importance of Machinery Costs

Given that cost management is so important, it stands to reason that managers should focus their efforts on those costs that really matter and can be managed (i.e., those that they have some control over). Figure 4 shows that machinery costs averaged between 30 and 40 percent of total costs for Kansas non-irrigated crop enterprises in 2001-2003 (value will be lower in the Corn Belt due to higher land costs). The most profitable (top 1/3) producers had machinery costs that were $20 to $38 (30% to 41%) lower than the least profitable producers (bottom 1/3). Furthermore, the differences in machinery costs explained over 40% of the differences in total costs and about one-third of the differences in profitability (Figure 5). Figure 6 shows that the relationship between machinery costs from one year to the next tends to be quite strong (correlation of 0.72). That is, producers that tend to have high machinery costs this year (relative to other producers) will likely have high machinery costs next year. While the points conveyed in Figures 5 and 6 may seem somewhat trivial, they are very important to recognize – machinery costs are important in explaining profitability difference between operations and machinery costs are persistent. In other words, machinery costs can be managed and they matter! While the information in Figures 5 and 6 are for crop farmers, and more specifically Kansas farmers, we will contend that these same patterns likely hold for most custom operation businesses where machinery represents a major cost (e.g., grain and forage harvesters, manure haulers/spreaders, chemical and fertilizer applicators).

Given that variability in machinery costs are such an important factor in explaining variability in profits, the questions is why do some producers consistently have lower machinery costs? Is it due to economies of size? Is it simply better management with regards to repairs and machinery efficiency? Figures 7 shows how machinery cost for wheat farms in Kansas, with and without labor, varies as farm size varies. It can be seen that machinery costs drop rapidly as farm size increases to 1500-2000 acres and due primarily to labor. Beyond this size, costs continue to decrease but most of the labor economies (difference between the two lines) have been captured. Figure 8 shows similar information from Illinois crop farms (Schnitkey and Lattz). While the cost per acre differs between the two states (partly due to different time periods), the general pattern of the line is similar, indicating that costs fall rapidly as farm size increases to a point and then decline much slower. Figure 9 shows data for total machinery costs in Kansas (i.e., labor is included) for various crops. The difference in machinery costs between the top 1/3 and bottom 1/3 for Kansas producers was $26.03 per acre (Figure 5) and the difference in farm size was 2,160 acres (top 1/3) compared to 1,080 (bottom 1/3). Using a crop-weighted average of the lines in Figure 8, we would expect a difference in costs of approximately $13 per acre for these two farm sizes. Thus, it might be reasonable to assume that about half of the machinery cost differences is size related, with the other half coming about from other factors.

Benchmarking Machinery Costs

Profitability measures such as return on assets (ROA) and return on equity (ROE) are what we are ultimately interested in and thus these measures should always be calculated and used in benchmarking. However, we often want to know *why* we might be more or less profitable than our competitors (or ourselves last year) and thus benchmarking on cost, and specifically machinery cost, makes a lot of sense. One of the first steps in benchmarking your machinery costs is to recognize what the different cost categories are. Figure 10 shows a breakdown of the different cost categories for Kansas producers. Labor and depreciation account for over half of the total machinery costs with repairs and interest making up another third, fuel is a little over 10% (would probably be a little higher today with high diesel prices), and insurance taxes and shelter make up the remaining category. Some people also

include a category for custom hire as a machinery expense (KFMA does this). While custom hire is a machinery-related expense, the rate paid essentially represents the categories already mentioned and thus it may be useful to allocate custom charges to the different machinery cost categories (this can be done using the percentages listed in Figure 10). Figure 11 shows the actual machinery costs for the wheat enterprise of a farm in northwest Kansas compared to the average of KFMA (external benchmarking). While this producer can compare their total costs against the total for other farmers in the area, some of the individual categories have little meaning because of the custom hire expense listed in the KFMA column. For example, Farm A appears to have very high labor, fuel, depreciation, and interest costs compared to the average (KFMA), but a big part of this is likely due to the fact that this farm hires very little custom work. After allocating the custom hire category to the other categories more meaningful benchmarking can be done (Figure 12). Now it can be seen that Farm A has similar fuel and interest costs as KFMA. Farm A's repairs are lower, but its depreciation is higher, indicating a possible trade-off associated with newer equipment. The main point that becomes clear when looking at the numbers in Figure 12 is that Farm A has high labor costs relative to the average of other producers. By knowing this information (the result of external benchmarking), this farm can now address the situation.

When managers do not know their own costs one way they sometimes estimate them is by using custom rates. Figure 13 shows what Farm A would estimate its costs to be if it based them on average custom rates in the area. The total cost, based on custom rates, would be $54.74 per acre, which is $18 lower than what the actual costs were. This brings out two important points: (1) using custom rates to proxy your own costs is probably not particularly accurate (i.e., you need to record your own costs) and (2) custom operators may have a cost advantage over farmers.

To better understand the relationship between actual farm costs and custom rates, a research project was conducted at Kansas State University (Beaton, Dhuyvetter, and Kastens). This study calculated a "Custom rate ratio," which was equal to the actual whole-farm machinery costs (182 farms) divided by the expected costs. Expected costs were calculated as the number of all farming operations multiplied by the average custom rates in Kansas for the respective operations. This was similar to what is shown in Figure 13 except that it was done for the entire farm for the year 2001 as opposed to a single acre of a single crop. If a producer's actual costs are the same as custom rates, then the ratio would equal 1.0 If actual costs are greater (less) than custom rates then the ratio will be greater (less) than 1.0. Figure 14 shows the ratio for the 182 farms that participated in the study. The average ratio was 1.306 and it ranged from a low of 0.55 to 2.47, reinforcing the fact that considerable variability exists in machinery costs between farms. It was found that the amount custom rates need to be increased to approximate actual farm-level costs depended on farm size (i.e., economies of size exist). For example, for a farm with 1,000 harvested acres, custom rates need to be increased by 25% to equal actual farm costs. This is similar to values quoted by Schnitkey (2001b) in Illinois, where custom rates needed to be increased by 23% to equal actual machinery costs.

Custom Operations

Based on the information in the preceding paragraph, it would appear that farmers should seriously consider hiring farming operations rather than doing them in house. Is this really true? If so, is there a trend towards more custom work being done today than in the past? If so, what type of farm is hiring the custom work? These are important questions for custom operators to be thinking of. To attempt to answer them we examined data in the KFMA database focusing on the machine custom hire expense

category. First of all, producers that tended to hire more custom work than their neighbors were no more or less profitable than those hiring less (data not shown). Because most of the research has shown that custom rates are lower than actual farm-level costs, this result was not expected. This might suggest that timeliness or quality of work issues could be offsetting any cost advantage (or something else may be going on that we have not identified at this point). When looking at the percent custom hire expense is of total machinery expense, it appears there might be a slight increase in the use of custom hire over the last several decades in Kansas (Figure 15). Figures 16-18 show how different sized farms, based on assets managed, have compared to the average farm over time for three categories – costs/acre, yields, and custom hire. It can be seen the gap between small and large farms with respect to costs has been increasing over time (Figure 16). That is, the cost advantage large farms have over small farms has been increasing. Large farms also have an advantage with regards to yields, but the difference between large and small farms has been relatively constant for the last 15 years (Figure 17). Figure 18 shows that both large and small farms tend to hire more custom work on a $/acre basis relative to the average farm (i.e., middle-sized farms hire less than either small or large farms). This result was confirmed anecdotally by a co-op manager in western Nebraska who indicated that his company has increased its custom operations over the last several years with the principal clientele being the small and big farms (Karre).

Based on the information in the preceding paragraph, there are several key issues for custom operators to think about. First, the continued polarization that is occurring in agriculture may present some good opportunities for custom operators to grow their businesses. In other words, the trend towards more small and large farms (with the middle-sized farm being squeezed out) may increase the demand for custom operations. However, the economies of size data would suggest that custom operators will also have to treat these two different types of customers differently – costs of providing services to large farms is likely considerably less than it is for small farms. This will increase the need to differentiate rates based on service provided and volume of business. Also, assuming the demand for custom operations increases, it will be important that these businesses are profitable in their own right (i.e., you likely won't be able to rely upon product markups as much as in the past). Thus, if the demand for custom operations increases in the future, the competition to see who will get to provide these services will also increase. These factors bring us back to where we started, the custom operation businesses that will be successful in the future will be better than average. This will require business owners and managers to not only know what their costs are (internal benchmarking), but more importantly to know what their strengths and weaknesses are relative to their competitors (external benchmarking).

Custom Harvesters Analysis and Management Program (CHAMP)

CHAMP was developed for two basic reasons: (1) to provide a service to custom grain harvesters to assist them with financial analyses of their operations, i.e., a business management component, and (2) to develop industry benchmarks that could be used by individual producers for management decisions and by the U.S. Custom Harvests, Inc (USCHI) for lobbying efforts, i.e., a policy component.

From 1997-2003, participation in CHAMP has ranged from 20 to 25 most years (there were 43 in 1997). There has been one forage harvester participate in each of the last two years, but at this point we have not actively recruited forage harvesters to participate. While the number of participants has been somewhat low (although we feel we have had broad representation of harvesters), those that have participated have been extremely loyal – 10 members have participated all 7 years and 20 of the 21 participating in 2003 were in the program in 2002. The program is probably best described as a "learning experience" both for us and for the participants. As we continue to learn more about the

harvesting business as well as individual harvesters' operations, we challenge the participants and force them to think about things that impact their businesses. Likewise, the participants continue to challenge us as to how different factors might be impacting their profitability. This type of relationship helps all of us improve at what we do.

So what are some of the things we've found over the years? First of all, custom harvesters as a group are not getting rich quickly (Figure 19). The custom harvesting business is very similar to farming in that there are good years and there are bad years and there are a lot of things you cannot control (i.e., weather, fuel prices). There was a positive relationship between revenue and cost (Figure 20) which indicates that those harvesters that incurred higher costs generally received more income (2003 results). Unfortunately it was not enough! Figure 21 shows that the relationship between profit and cost is negative – i.e., those people with high costs had lower profits. Just like farms, we see considerable variability between the top operators and the bottom operators. Figure 22 shows the variability of profit per separator hour (top 1/3, middle 1/3, bottom 1/3, and average) by year. The difference in profit between the top 1/3 and the bottom 1/3 has ranged from roughly $60 to $120 and averaged about $85. Figure 23 shows similar data except that it is on a per acre harvested basis. Here the difference between the top 1/3 and the bottom 1/3 has ranged from $6.43 to $10.33 per acre and average $8.42. Thus, while the average custom grain harvester is not getting rich quickly, there are some harvesters who are doing quite well while others are consistently losing equity. Once again, this indicates how important both internal and external benchmarking is. First, I need to know if I'm making money or not (internal benchmarking). But, I also need to know how my competitors are doing (external benchmarking). Think about a harvester who might be losing money, but simply attributing it to "bad times that will pass." If other harvesters are profitable during these same times, then it may *not* pass and continuing the business as is may be financially devastating.

What do CHAMP Participants Do and What Do They Get?

In order for harvesters to participate in CHAMP they simply need to fill out the forms (typically seven pages), send them in, and pay their share of the cost (input forms and past harvest years reports can be found at www.aganalysisplus.com – click on the CHAMP link). Since 1998 the harvester's share of the cost is $150 and the remainder has been paid by USCHI and John Deere. Participants receive an individualized report of their operations compared to the group average (Figure 24), showing revenue, costs, and key production measures (e.g., acres/hour, acres/combine, separator hours/combine). A second page of the report is a printed copy of their balance sheets as of the beginning and end of the year. In addition to these two pages, each participant gets a series of graphs (12 last year) that shows its data over time compared to the group average (i.e., internal and external benchmarking). A final thing that the participants get is the individualized attention/analysis pertaining to specific questions they may have (this has been possible because of the relatively small size of the group). For example, Figures 28 and 29 represent data that were pulled out in response to specific questions that were asked by individuals (these charts are not part of the routine analysis). Additionally, a number of CHAMP participants will call us throughout the year with various questions (may or may not be related to their harvesting businesses) simply because of the relationship we have built over the years.

We don't know exactly what the CHAMP participants get out of the program, but what we have been told is that they have found the analysis and benchmark comparisons to be very useful as they communicate with their lenders (even though lenders may be agriculturally oriented, they typically do not have a very good feel for what numbers should be for the custom harvesting industry). Harvesters

have used their CHAMP results to negotiate with farmers to increase their rates when fuel prices increased significantly. Some have used their results to make management changes in the way they run their businesses (some have exited the business).

How has USCHI used the CHAMP data? We have worked with various board members putting together special analyses/reports focusing on current issues (e.g., impact of drought, Karnal Bunt). In the January 2005 issues of *Harvest News*, Tim Baker (operations manager for USCHI), referring to the Karnal Bunt compensation that was finally approved by USDA stated, "This compensation was only brought to fruition through the combined efforts of the US Custom Harvesters and the reliable and provable numbers gleaned from the CHAMP program." Thus, the development of benchmarks that can be used by individual harvesters for management purposes has also helped them in other ways.

Summary and Conclusions

Knowing when you stand with your business is extremely important in a competitive industry. That is because the average or below average producer likely will end up going out of business over time. It has been well documented that the difference between the top producers and the average or bottom producers is quite significant, with most of this difference being cost related. Thus, being "better than average" is typically due to being a low cost operator (cost per unit of output). Data presented here suggest that this likely holds equally true for custom operators. In addition to machinery costs representing a major cost category for crop producers (and custom operators), machinery costs tend to be fairly persistent over time. This suggests that farm managers (and custom operators) should focus their management efforts on cost control, and more specifically on machinery costs.

In order to manage your operation, you need to thoroughly understand it and that means having a good understanding of cost and income categories and the primary drivers of these. Tracking how the key performance indicators of your business change over time is referred to as internal benchmarking. Internal benchmarking is necessary for any business that wants to know if it is improving over time. However, as important as internal benchmarking is external benchmarking. External benchmarking refers to how well your business compares to its competitors. One of the biggest problems custom operators have with regards to managing their businesses is the difficulty of doing any external benchmarking due to the lack of industry averages (i.e., benchmarks). CHAMP was developed as a means of providing industry benchmark data for custom grain harvesters. While participation in the program has been relatively low, the program has been successful at generating reasonable industry benchmarks.

The increasing trend in agriculture towards more large and small farms bodes well for custom operators as the demand for their services will likely increase. However, as the demand for custom operation services increases, the competition in the industry will likely also increase. This increased competition will reward well managed firms and penalize those poorly managed operations. Thus, the value of "knowing where your business stands" via internal and external benchmarking will be more important than ever. The challenge many custom operators will have is finding reliable industry averages they can use for external benchmarks.

MISCELANEOUS – Provided simply for your information (FYI)

AgManager.info

AgManager.info is the K-State Ag Econ Department's website for producers and agribusinesses. On this website we have a number of research and extension factsheets/bulletins. In addition, we have a number of Decision Tools (i.e., Excel spreadsheets) relating to various farm management and marketing topics. There are five machinery-related spreadsheets on the website, some of which we believe could be helpful for this group. Figures 30-35 provide a glimpse of the kind of information that can be generated using these spreadsheets.

Historical Custom Rates in Kansas

We often hear farmers complain about how much machinery costs keep increasing, however, it is important to recognize that the price of a new piece of equipment is not the same thing as machinery costs. Figures 36-42 show historical custom rates for various farming operations. It can generally be seen that growth rates in custom rates have been less than the inflation rate and thus it seems hard to build the case that machinery costs have been "increasing rampantly."

References

Albright, M. 2002. "Characteristics of Profitable Farms: An Analysis of Kansas Farm Management Association Enterprise Data." *In* T. Kastens (ed) Risk and Profit Management Conference Proceedings. Kansas State University. August 15-16, 2002. Manhattan, KS. Available online at www.agmanager.info/crops/prodecon/production.

Beaton, A., K. Dhuyvetter, and M. Albright. 2001. "Examining Differences Between High, Medium, and Low Profit Producers for Kansas Farm Management Association Crop Enterprises in 2000." Available online at www.agmanager.info/crops/prodecon/production.

Beaton, A.J., K.C. Dhuyvetter, and T.L. Kastens. 2003. "Custom Rates and the Total Cost to Own and Operate Farm Machinery in Kansas." Kansas State Univ. Coop. Ext. Serv. Bull. MF-2572.

Center for Farm Financial Management, University of Minnesota. Available online at www.agrisk.umn.edu/FINBIN.asp.

Dhuyvetter, K.C. and T.L. Kastens. 2005. "An Analysis of Kansas Farm Management Association Enterprise Data, 2001-2003." Department of Agricultural Economics, Kansas State University, unpublished data.

Irwin, S.H., J. Martines-Filho, and D.L. Good. 2003. "The Pricing Performance of Market Advisory Services in Corn and Soybeans Over 1995-2001: A Non-Technical Summary." AgMAS Project Research Report 2003-06. Department of Agricultural and Consumer Economics, University of Illinois. Available online at http://www.farmdoc.uiuc.edu/agmas/.

Lattz, D. 2001. "High/Low One-Third Return Grain Farm Comparisons." Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, Farm Business Management Factsheet FEFO 01-14. Available online at www.farmdoc.uiuc.edu/manage/newsletters/html/070901.html.

Karre, Doug. Frenchman Valley Coop, McCook, Nebraska. Personal communication, December 8, 2004.

Kastens, T.L. and K.C. Dhuyvetter. 2004a. "Management Factors: What is Important, Prices, Yields, Costs, or Technology Adoption?" Department of Agricultural Economics, Kansas State University. Available online at www.agmanager.info/farmmgt/finance/management/.

Kastens, T.L. and K.C. Dhuyvetter. 2004b. "Valuing and Buying Farmland, with a Consideration of Non-Ag Features." Department of Agricultural Economics, Kansas State University. Available online at www.agmanager.info/farmmgt/finance/management/land/land_buy.

Nebraska Farm Business Association, University of Nebraska - Lincoln. Available online at www.nfbi.net/.

Nivens, H.D., T.L. Kastens, and K.C. Dhuyvetter. "Payoffs to Farm Management: How Important is Grain Marketing?" Journal of Agricultural and Resource Economics 34,1(April, 2002):193-204.

Schnitkey, G. and D. Lattz. 2003. "Size Economies on Illinois Grain Farms." Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, Farm Business Management Factsheet FEFO 03-10. Available online at www.farmdoc.uiuc.edu/manage/newsletters/fefo03_10/fefo03_10.html.

Schnitkey, G. 2001a. "Do Some Farms Consistently Have Higher Profits Than Others?" Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, Farm Business Management Factsheet FEFO 01-15. Available online at www.farmdoc.uiuc.edu/manage/newsletters/html/072001.html.

Schnitkey, G. 2001b. "Per Acre Machinery Costs on Illinois Grain Farms." Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, Farm Business Management Factsheet FEFO 01-09. Available online at www.farmdoc.uiuc.edu/manage/newsletters/html/041801.html.

Figure 1

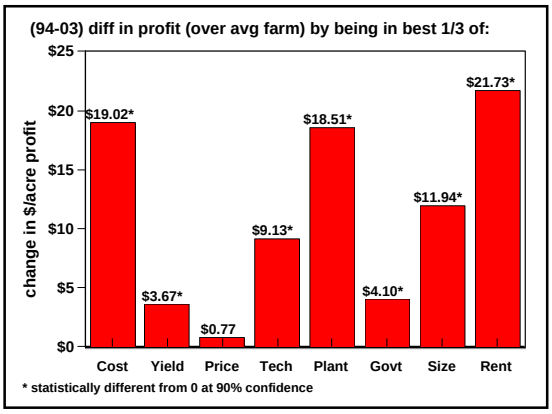


Figure 2

Low- vs High-Profit Groups in Illinois
(1995-2000 average return – Source: University of Illinois)

Trait/category	Low quartile	High quartile
Total acres	**672**	**1,007**
Owned	**171 (25%)**	**74 (7%)**
Share rent	**311 (46%)**	**789 (78%)**
Cash rent	**190 (28%)**	**144 (14%)**
Total costs ($/A)	**$430**	**$340**
Land	**133**	**98**
Power	**71**	**55**
Buildings	**23**	**19**
Labor	**50**	**30**
Variable inputs	**99**	**92**
Other	**54**	**46**
Yield (bu/A)		
Corn	**148**	**160**
Soybeans	**47**	**50**
Prices ($/bu)		
Corn	**$2.48**	**$2.50**
Soybeans	**$6.25**	**$6.02**

Figure 3

Difference between the High 1/3 and Low 1/3 farms ranked on return to management
Kansas Farm Management Association Enterprise Analysis
Nonirrigated Crops -- State Averages, 2001-2003

	(High 1/3 less Low 1/3)				
	Corn	Sorghum	Wheat	Soybean	Alfalfa
Number of farms	105	194	327	170	57
Enterprise acres	284	224	310	215	47
Yield per acre, bu or ton	**11.8**	**6.5**	**6.5**	**4.8**	**0.7**
Price per bu or ton	**$0.02**	**-$0.06**	**$0.09**	**-$0.01**	**$7.94**
INCOME ($/acre)					
Crop income	$8.83	$2.81	$18.44	$16.97	$91.32
Gross income	**$2.62**	**$10.25**	**$19.78**	**$21.04**	**$89.39**
COSTS ($/acre)[1]					
Seed	-$1.77	-$2.24	-$0.71	-$1.95	-$5.18
Fertilizer	-$11.04	-$8.10	-$3.28	-$0.91	-$3.23
Herbicide-insecticide	-$6.70	-$3.40	-$1.20	-$4.78	-$0.96
Crop insurance	$0.23	-$0.02	-$0.30	-$0.02	-$0.02
Machinery	-$37.33	-$22.76	-$20.21	-$26.16	-$37.70
Other	-$11.06	-$10.08	-$9.30	-$9.53	-$16.30
Land	-$13.11	-$9.29	-$7.74	-$5.34	-$2.99
Interest	-$8.50	-$6.47	-$3.72	-$8.67	-$9.45
Total Cost	**-$89.28**	**-$62.37**	**-$46.46**	**-$57.36**	**-$75.84**
Net Return to Management	**$91.29**	**$73.01**	**$65.97**	**$78.23**	**$165.55**

[1] Based on the operator's share of production, and thus includes only production expenses paid by the operator.

Figure 4

Kansas Farm Management Association Enterprise Analysis
Nonirrigated Crops -- State Averages, 2001-2003

	Corn	Sorghum	Wheat	Soybean	Alfalfa	
Number of Farms	105	194	327	170	57	Total Ac
Average Acres	328	318	585	327	103	1,660
Costs, $ per Acre						Wtd Avg
Seed	$26.07	$8.76	$5.75	$21.69	$8.15	$13.62
Fertilizer	32.42	20.12	17.08	3.86	8.75	17.57
Herb-Ins	22.35	18.78	4.55	16.93	10.73	13.61
Crop Ins	5.05	3.08	3.45	3.98	0.16	3.59
Machinery	**68.90**	**53.39**	**54.88**	**62.21**	**79.03**	**60.30**
Other	19.15	15.90	15.68	17.93	20.84	17.17
Land	35.40	17.39	20.50	25.31	39.05	24.94
Interest	17.90	12.52	11.17	14.83	16.06	13.78
Total Cost	$227.24	$149.93	$133.05	$166.74	$182.76	$164.59
Machinery, %	**30.3%**	**35.6%**	**41.2%**	**37.3%**	**43.2%**	**36.6%**

Figure 5

Kansas Farm Management Association Enterprise Analysis
Nonirrigated Crops -- State Averages, 2001-2003

	Corn	Sorghum	Wheat	Soybean	Alfalfa	
Machinery Costs, $/acre						Wtd Avg
High profit farms	$54.32	$42.85	$47.58	$50.04	$61.30	$49.35
Mid profit farms	$60.73	$51.68	$49.26	$60.38	$76.77	$55.76
Low profit farms	$91.65	$65.61	$67.79	$76.19	$99.00	$75.38
High less low, $	**-$37.33**	**-$22.76**	**-$20.21**	**-$26.16**	**-$37.70**	**-$26.03**
High less low, %	**-40.7%**	**-34.7%**	**-29.8%**	**-34.3%**	**-38.1%**	**-34.5%**
Differences between high profit farms and low profit farms in …						
Net returns	**$91.29**	**$73.01**	**$65.97**	**$78.23**	**$165.55**	**$80.90**
Total costs	**-$89.28**	**-$62.37**	**-$46.46**	**-$57.36**	**-$75.84**	**-$61.92**
Cost/net returns	**97.8%**	**85.4%**	**70.4%**	**73.3%**	**45.8%**	**76.5%**
Mach/total costs	**41.8%**	**36.5%**	**43.5%**	**45.6%**	**49.7%**	**42.0%**
Mach/net returns	**40.9%**	**31.2%**	**30.6%**	**33.4%**	**22.8%**	**32.2%**

Figure 6

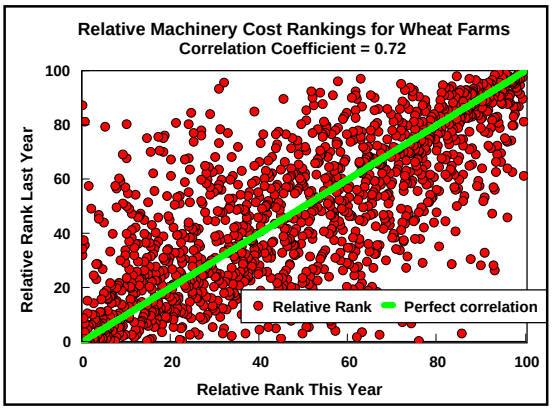


Figure 7

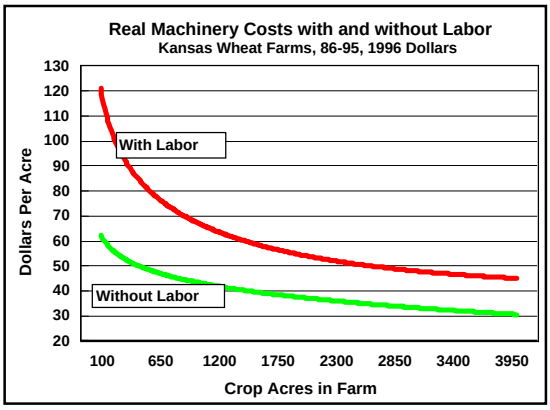


Figure 8

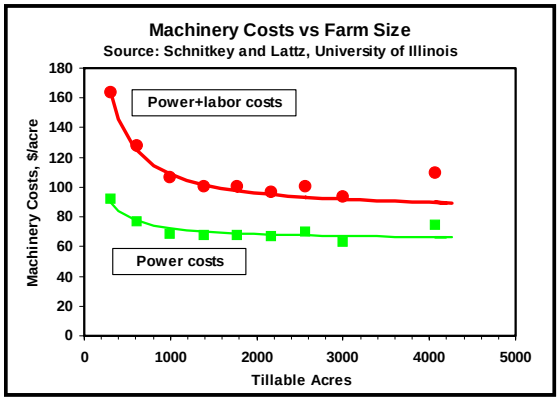


Figure 9

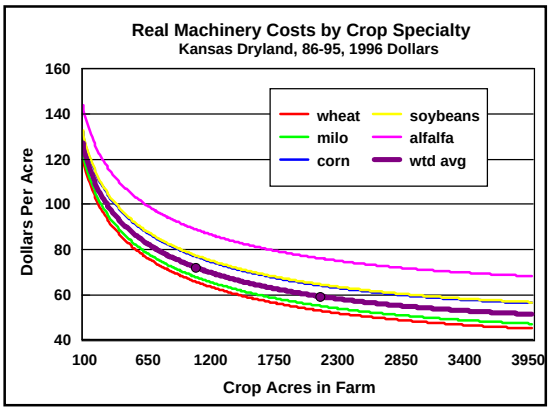


Figure 10

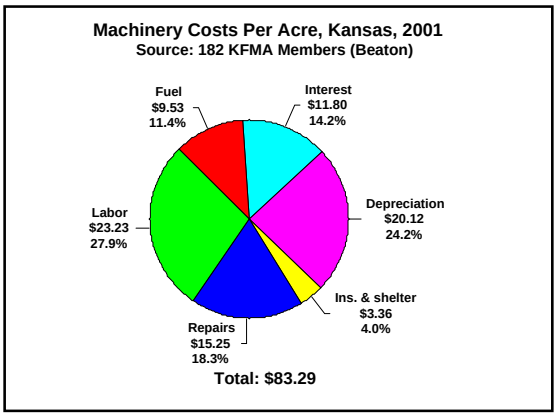


Figure 11

Machinery Costs NW KS Wheat Enterprises

	KFMA 95	Farm A 97
Labor (hired & unpaid)	$17.23	$27.00
Gas/Fuel/Oil	$ 6.03	$ 7.57
Repair & Maintenance	$11.43	$ 9.19
Personal Property Tax	$ 0.53	$ 0.49
General Insurance	$ 1.97	$ 1.89
Utilities	$ 1.69	$ 1.48
Auto Expense	$ 0.72	$ 0.00
Economic Depreciation	$ 8.71	$12.91
Net Machine Hire	$11.93	$ 0.82
Interest (9% assign)	$ 8.97	$11.40
Total	$69.21	$72.75

Machine hire makes it hard to compare

Figure 12

Machinery Costs NW KS Wheat Enterprises

combine tax, insurance, utilities; prorate auto expense and machine hire

	KFMA 95	Farm A 97
Labor (hired & unpaid)	$21.08	$27.31
Gas/Fuel/Oil	$ 7.38	$ 7.66
Repair & Maintenance	$13.99	$ 9.29
Tax, Insurance, Shelter	$ 5.13	$ 3.90
Economic Depreciation	$10.66	$13.06
Interest (9% assign)	$10.97	$11.53
Total	$69.21	$72.75

Figure 13

Machinery Costs NW KS Wheat Enterprises
using custom rates (1997) approach

	# operations	$/operation
Undercutter (V-Blade)	4	$ 4.68
Offset Disk	1	$ 4.38
NH3 Application	1	$ 6.16
Drill	1	$ 5.61
Harvest 40 bu.	1	$19.87
Total		$54.74

Where's the rest of the costs? Or, is this what they should be?

Figure 14

Relative custom rate ratio

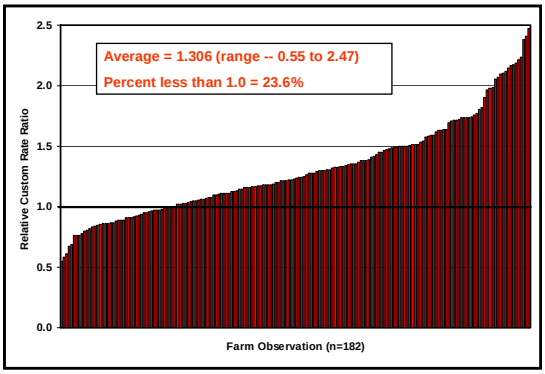


Figure 15

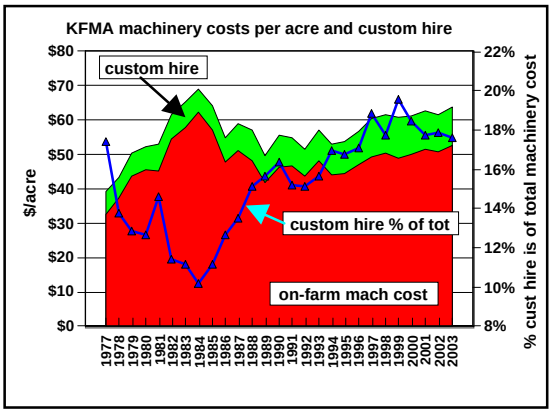
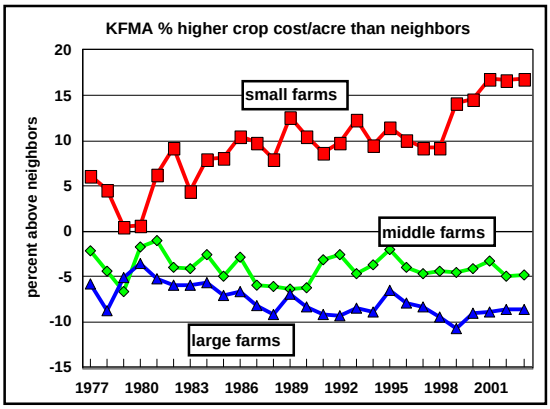
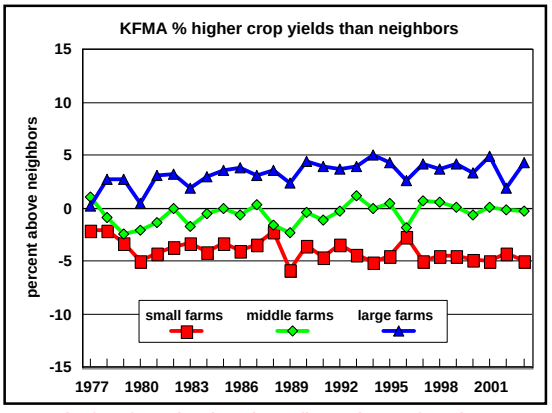


Figure 16



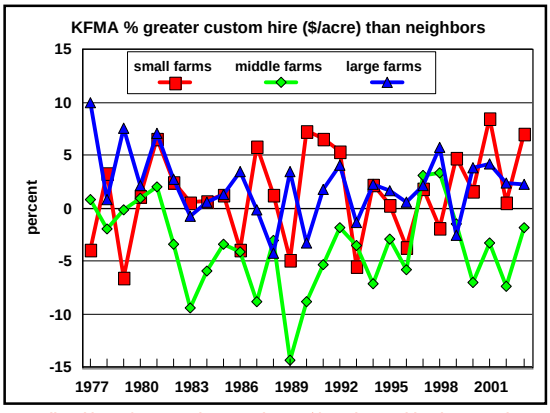
Example of one factor that showed a very distinct trend across farm size

Figure 17



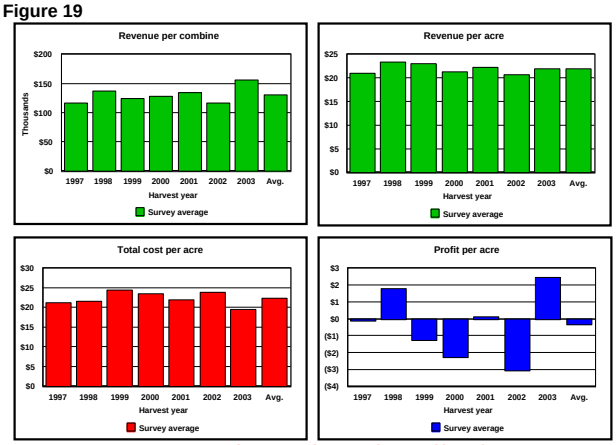
Example of one factor that showed a smaller trend across farm size

Figure 18



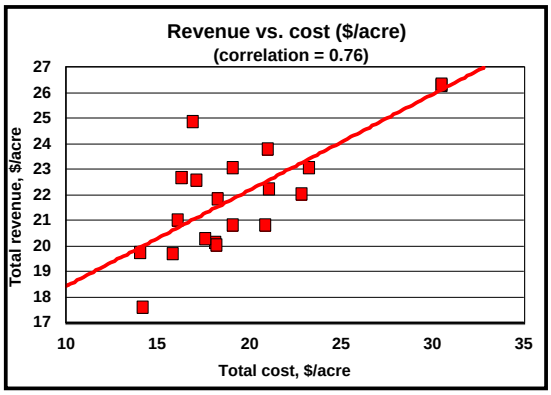
Small and large farms tend to spend more $/acre in cust hire than avg size.

Figure 19



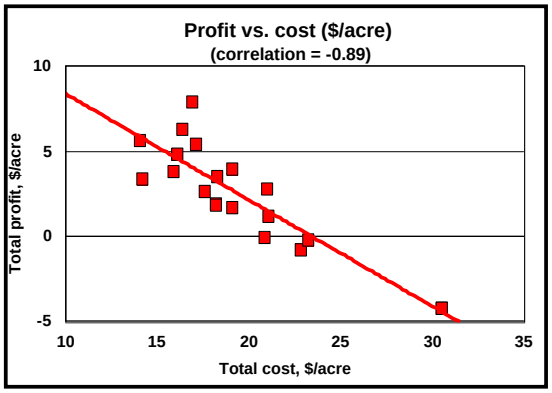
On average, custom harvesters have not been making a fortune

Figure 20



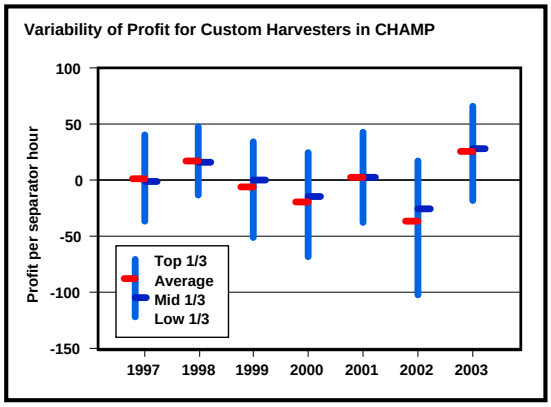
2003 harvest year results

Figure 21



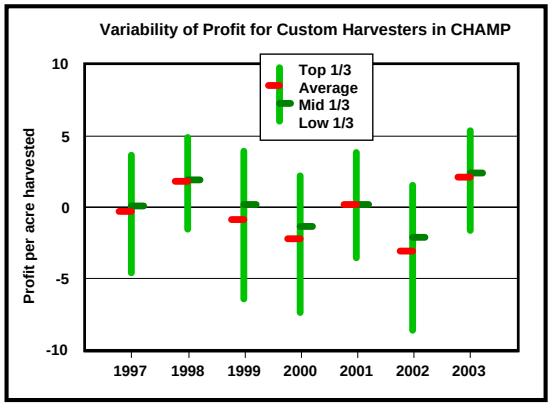
2003 harvest year results

Figure 22



Considerable variability between top and bottom third operators

Figure 23



Considerable variability between top and bottom third operators

Figure 24

Custom Harvester Analysis and Management Program (CHAMP)
2003 Harvest Year
Individual Firm Report

Happy Harvesters Inc.
Box 999
Wheat Country, KS 99999

	Firm Value	Survey Average Value	Firm Value per Combine	Survey Avg. of Value per Combine	Firm Value per per Acre	Survey Avg. of Value per per Acre	Firm Value per per Hour	Survey Avg. of Value per per Hour	
Number of Machines Operated	3.0	4.09	-----	-----	-----	-----	-----	-----	
Value of Combines	$375,000	$477,660	$125,000	$116,338	$17.38	$17.20	$193.60	$204.79	
Value of Platforms	$90,000	$107,256	$30,000	$26,312	$4.17	$3.89	$46.46	$45.51	
Value of Other Equipment	$310,000	$419,037	$103,333	$104,006	$14.37	$15.03	$160.04	$180.76	
Value of Other Assets	$75,000	$123,207	$25,000	$29,987	$3.48	$4.62	$38.72	$54.34	
Total Assets	$850,000	$1,127,160	$283,333	$276,643	$39.39	$40.75	$438.82	$485.40	
Total Acres Covered	21,579	29,519	7,193	7,052	1.0	1.0	11.14	12.10	
Combine Rent Acres	500	1,118	167	131	0.023	0.018	-----	-----	
Small Grains Percent	78.4	76.5	-----	-----	-----	-----	Combine Efficiency		
Total Fields Harvested*	154	226	51.3	56.8	140.1	150.8	sep hrs/engine hrs		
Total Separator Hours in 2003	1,937	2,460	646	588	0.090	0.084	74.8%	76.3%	

JOHN DEERE

U.S. Custom Harvesters Inc.

									% of Total Revenue Firm	% of Total Revenue Survey Avg.
INCOME AND EXPENSE										
Harvest Revenue	$465,240	$621,613	$155,080	$150,034	$21.56	$21.34	$240.19	$254.68	98.3%	97.0%
Combine Rent Revenue	$4,167	$11,380	$1,389	$1,328	$0.19	$0.18	$2.15	$2.08	0.9%	0.8%
Other Revenue	$3,850	$13,777	$1,283	$4,126	$0.18	$0.49	$1.99	$6.05	0.8%	2.2%
Total Revenue	$473,257	$646,769	$157,752	$155,488	$21.93	$22.01	$244.32	$262.82	100.0%	100.0%
Labor (paid and unpaid)	$101,588	$134,631	$33,863	$32,024	$4.71	$4.46	$52.45	$53.04	21.5%	20.3%
Travel	$18,322	$23,706	$6,107	$5,861	$0.85	$0.84	$9.46	$9.96	3.9%	3.8%
Fuel and Lubrication	$53,945	$66,652	$17,982	$16,145	$2.50	$2.26	$27.85	$26.83	11.4%	10.3%
Repair and Maintenance	$48,218	$64,182	$16,073	$15,881	$2.23	$2.24	$24.89	$26.78	10.2%	10.2%
Insurance	$27,038	$31,594	$9,013	$7,756	$1.25	$1.09	$13.96	$12.98	5.7%	5.0%
Telephone and Utilities	$9,488	$9,881	$3,163	$2,493	$0.44	$0.35	$4.90	$4.11	2.0%	1.6%
Other Expenses	$32,863	$44,697	$10,954	$11,071	$1.52	$1.47	$16.97	$17.63	6.9%	6.7%
Market Depreciation	$92,755	$128,006	$30,918	$31,249	$4.30	$4.29	$47.89	$50.35	19.6%	19.5%
Interest on Assets (assigned)	$53,651	$71,145	$17,884	$17,461	$2.49	$2.57	$27.70	$30.64	11.3%	11.7%
Total Expense	$437,868	$574,495	$145,956	$139,941	$20.29	$19.56	$226.05	$232.30	92.5%	88.9%
Total Operating Profit	$35,389	$72,274	$11,796	$15,546	$1.64	$2.44	$18.27	$30.51		

Debt-to-Asset Ratio (end of year)	38.7%	41.9%	
Return on Assets	10.5%	13.3%	
Return on Equity (based on IS)	13.1%	xxx	<=== Operating profit + interest charged on equity divided by beginning of year equity.
Return on Equity (based on BS)	9.4%	xxx	<=== Change in balance sheet equity divided by the beginning of year equity.
Expenses/$100 Revenue	$92.52	$88.87	

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*Value used per acre for Total Fields Harvested represents the average field size in acres.
Note: Some reported values were modified from those reported on the survey due to arithmetic and other data entry errors.

Figure 25

Balance sheet for custom harvesting business only, 2003 (read the footnotes)

Wheat Country, KS 99999

ASSETS (market value)	beginning 01/01/03 $	end 12/31/03 $
Current Assets		
Cash on hand & in checking	4,600	6,850
Savings, bonds, stocks, etc.	14,300	15,800
Accounts receivable	2,800	3,600
Supply inventories	3,600	4,500
Other current assets (specify)	0	0
D1. TOTAL CURRENT ASSETS	25,300	30,750
Non-current Assets		
Combines (from A1+B1, A2+B2)	503,000	437,350
Non-combine equipment (from C1, C2)	315,000	289,800
Market value of business real estate (i.e., office, storage bldgs., etc.)	45,000	50,000
D2. TOTAL NON-CURRENT ASSETS	863,000	777,150
D3. TOTAL CUST. HARV. ASSETS (D1+D2)	888,300	807,900

LIABILITIES & OWNER EQUITY	beginning 01/01/03 $	end 12/31/03 $
Current Liabilities		
Accounts payable	1,200	2,200
Short term loans (due within 1 yr.)		
principal outstanding	15,300	12,750
accrued interest	377	314
Other current liabilities (specify)	0	0
D4. TOTAL CURRENT LIABILITIES	16,877	15,264
Non-current Liabilities		
Long term loans (due beyond 1 yr.)		
principal outstanding	305,000	295,000
accrued interest	2,820	2,728
Other non-current liabilities (specify)	0	0
D5. TOTAL NON-CURRENT LIABILITIES	307,820	297,728
D6. TOTAL CUST. HARV. LIABILITIES (D4+D5)	324,697	312,992
D7. TOTAL CUST. HARV. NET WORTH (D3-D6)	563,603	494,908
Change in equity ======>		(68,695)

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U.S. Custom Harvesters Inc.

TOTAL EQUITY (custom harvesting and outside businesses)

	01/01/03	12/31/03
Investments in other businesses (such as a farm) and non-business investments (such as your residence). Report only the NET investment, which is assets less liabilities (net worth), for these investments:	D8. 120,000	130,000
Overall equity or net worth for whole business (D7+D8)	D9. 683,603	624,908
Change in equity ======>		(58,695)

In balance sheet above, except for D8 and D9, values are those assigned to ONLY the CUSTOM HARVESTING BUSINESS. If you run multiple businesses within your overall business, without tracking assets and liabilities accordingly, you will need to prorate proper values to the custom harvesting business. All values are market values, not income tax basis values.

AgAnalysis

Figure 26

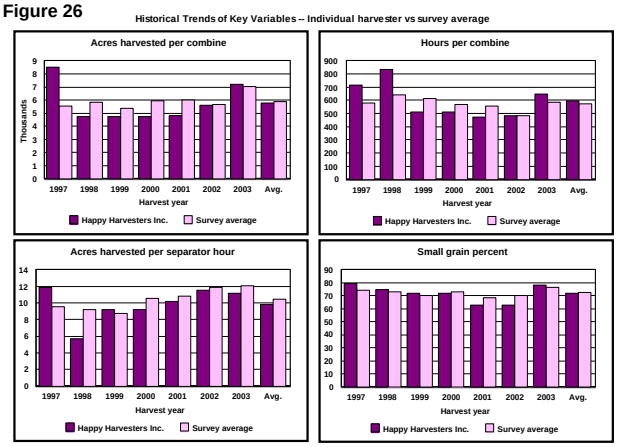


Figure 27

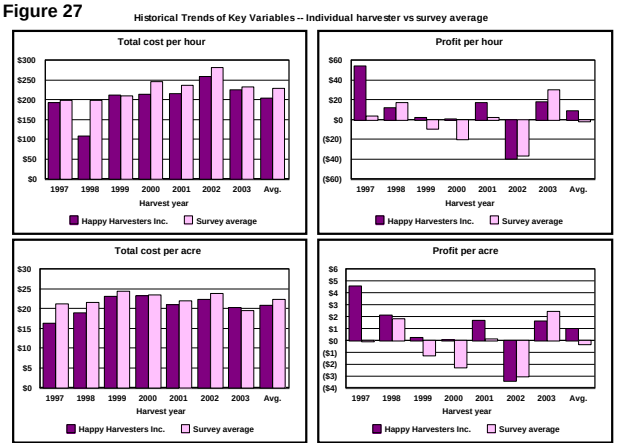
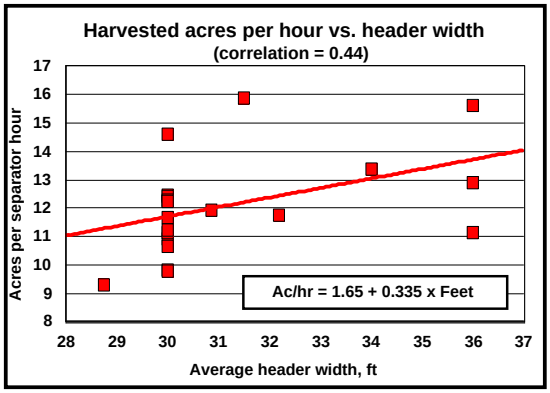
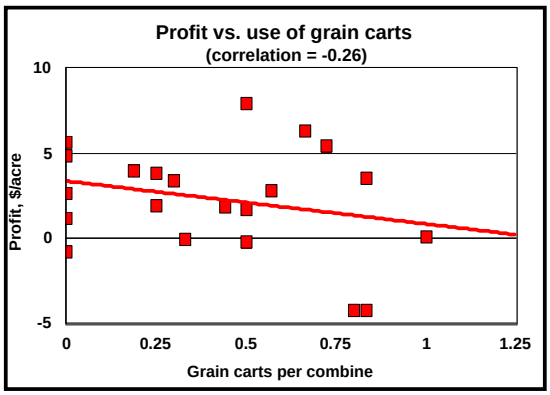


Figure 28



Example of analysis based upon request from individual

Figure 29



Example of analysis based upon request from individual

Figure 30

Machinery Decision Tools at www.agmanager.info

OwnCombine.xls

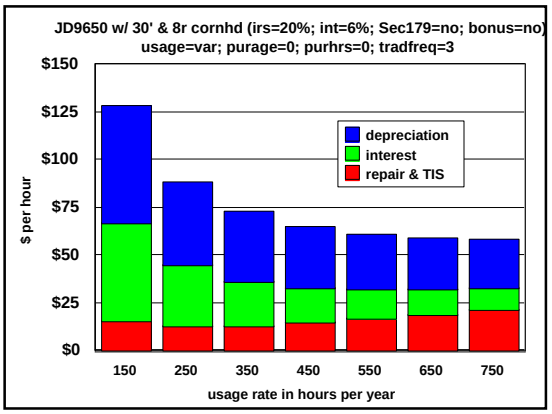
OwnBaler.xls

OwnSpray.xls

KSU-MachCost.xls

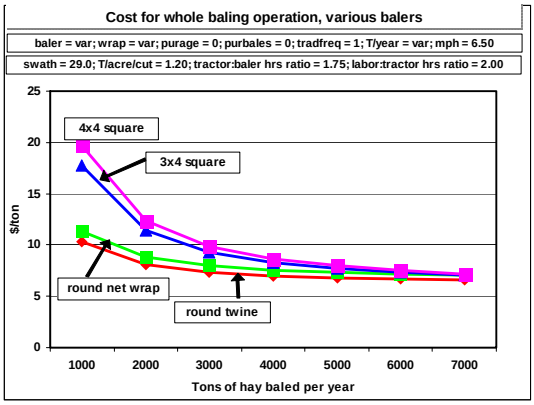
OwnTractor.xls

Figure 31 *OwnCombine.xls*



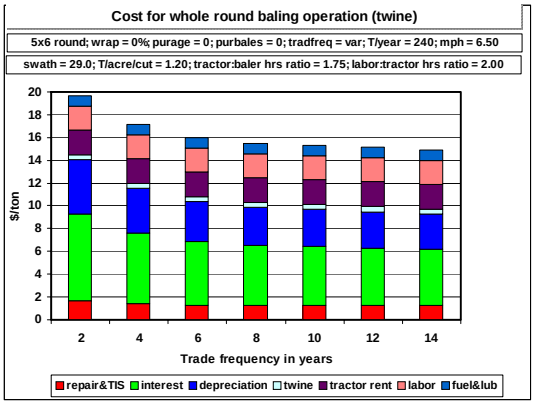
Putting on more hours per year really pays off.

Figure 32 *OwnBaler.xls*



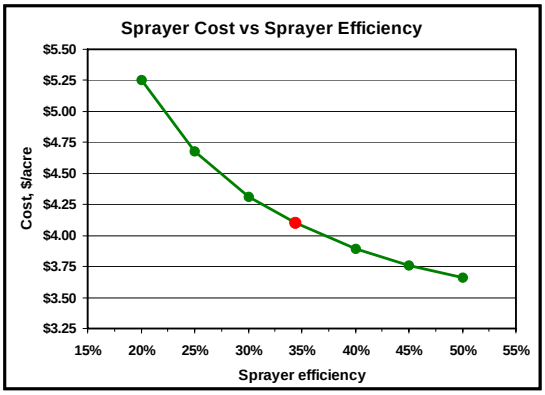
Matches approximately with custom rates in the 1500-2000 T/year range.

Figure 33 *OwnBaler.xls*



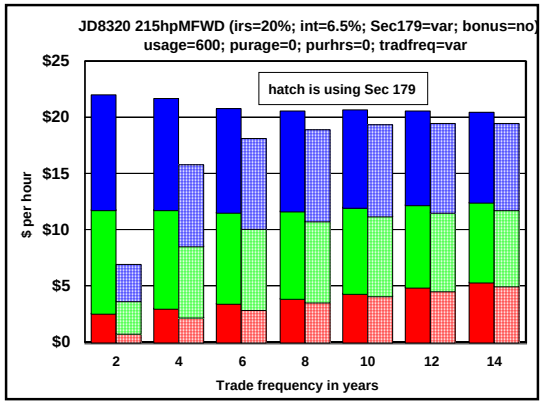
Costs seem high for this small (typical) hay operation starting with a new baler, but, really, sort of like Beaton's research showed.

Figure 34 *OwnSpray.xls*



Efficiency of sprayer use has a big impact on cost

Figure 35 *OwnTractor.xls*



With and w/o Sec 179 on buying a new tractor – difference driven by time held.
Do you have sufficient taxable income?

Figure 36

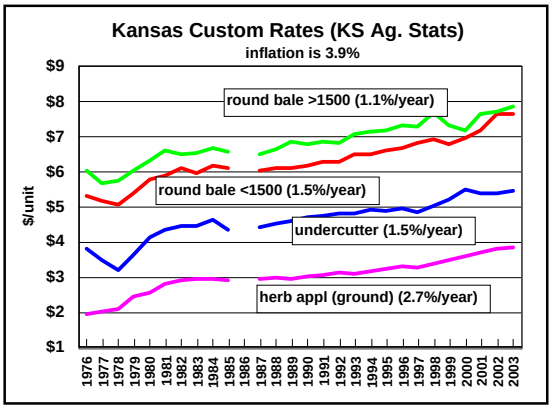


Figure 37

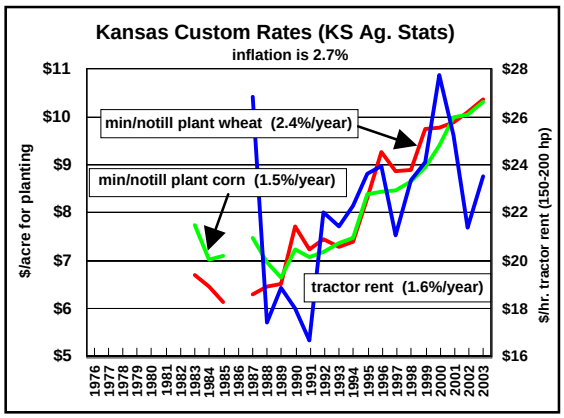


Figure 38

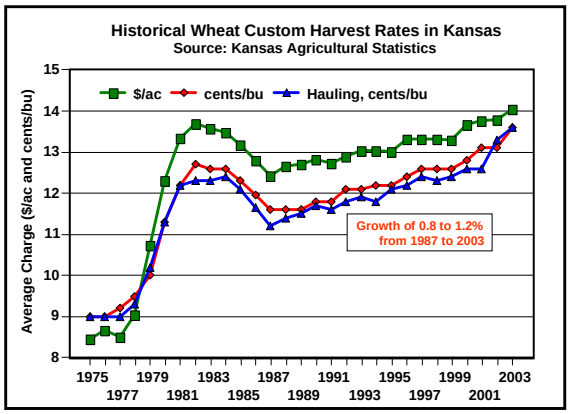


Figure 39

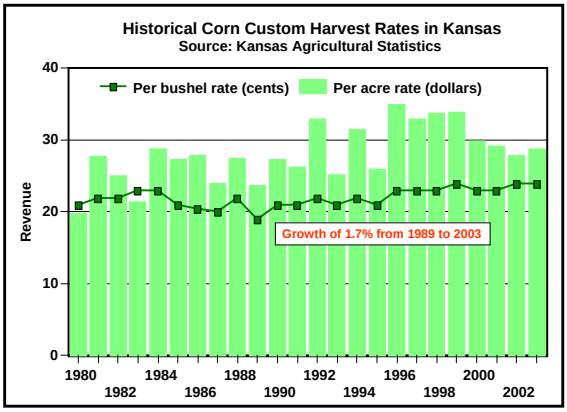
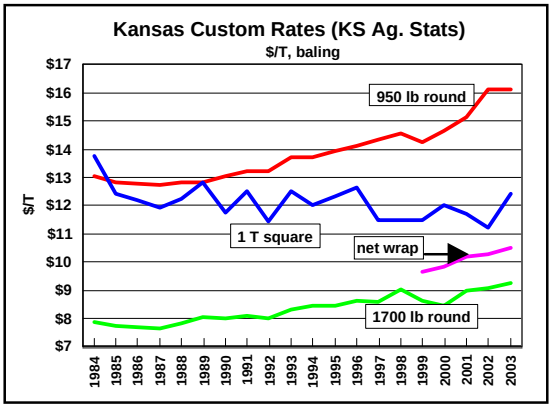
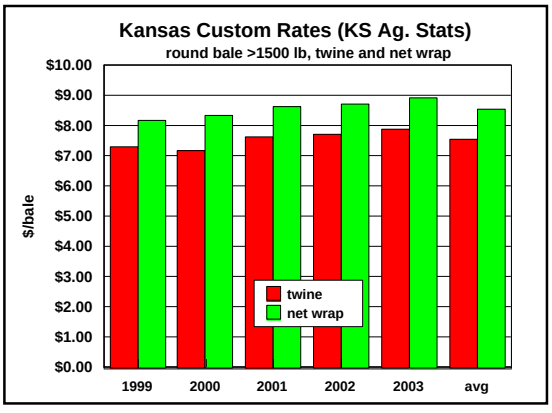


Figure 40



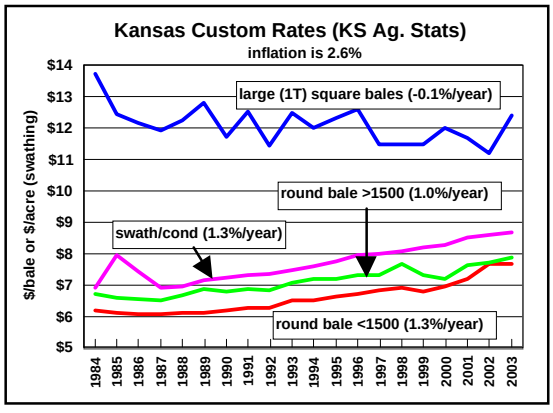
2003 $/ton: Big square ($12.41); Big round w/twine ($9.27); w/ net wrap ($10.52)

Figure 41



Net wrap costs about $1/bale more (or hay producers willing to pay $1 more)

Figure 42



Inflation has been rising faster than machinery costs