AN ECONOMIC ANALYSIS OF ADJUSTED GROSS REVENUE-LITE INSURANCE ON FARM INCOME VARIABILITY FOR SOUTHEAST KANSAS FARMS

by

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Abstract

In today's production agricultural sector, managing risk is essential to insuring the economic well being and sustainability of successful enterprises. Considering the inherent risks present in today's agricultural arena, risk management has become the central focus of discussions for policy makers and producers alike. Therefore the objective of this research paper is to examine the impact a whole-farm adjusted gross revenue insurance risk management program (AGR-Lite) has on reducing farm income variability using historical farm level data for Southeast Kansas farms.

A panel data set of actual farm level income data was compiled to evaluate the impact of AGR-Lite on farm income variability for 219 Southeast Kansas farms. Although actual income tax records were not available annual data over the period 1993 to 2005 from the Kansas Farm Management Association was used to reproduce the essential information a farm manager would need from IRS form 1040 schedule F and inventory records to purchase AGR-Lite (Langemeier, 2003). Income distributions for each farm from 1999 to 2005 were calculated for two strategies; the farm manager did not insure and the manager insured each year using AGR-Lite as a stand-alone product. The AGR-Lite insurance strategy assumed a 75% coverage level and 90% payment rate. The income distributions were compared using three premium scenarios.

In general, the results of this study reveal participation in the AGR-Lite program, in most instances, reduced standard deviation, Coefficient of Variation (CV), and Downside Risk (DR). Additionally average minimums and Certainty Equivalents (CE)

were increased with the product. The following results reflect application of Actuarially Fair Average Rate for farms with Indemnities (AFARI), which is believed to reflect actual market performance. Additionally the following reflects results using Net Farm Income (NFI). Results reveal that purchasing AGR-Lite reduced standard deviations 7.01%, 11.34%, 0.29%, and 2.53% for total, crop, livestock, and dairy farms assuming AFARI. However beef farms were the lone category to sustain a 0.81% standard deviation increase. Despite reductions in absolute variability, relative risk (CV) increased 18.94%, 17.12%, 53.84%, and 3.19% for total, livestock, beef, and dairy. Crop farms were the only category to generate a CV reduction (9.52%). Under AFARI crop farms generated the largest minimum increase, reducing downside risk, by 69.97%. For total and dairy farm categories average minimums increased 62.93% and 0.60%. The remaining farm categories, livestock and beef, yielded 65.07% and 57.03% reductions to average minimum.

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CHAPTER 1 - Introduction

1.1 Overview

In today's production agricultural sector, managing risk is essential to insuring the economic well being and sustainability of successful enterprises. Despite the inherent and inescapable presence of risk in agriculture, some risk is manageable. Risk management is not addressed as a single solution nor does it operate with defined set of procedures that inoculates a farm against risk. In this uncertain and unpredictable environment in which farm managers and policy makers operate, mechanisms employed to mitigate risk must continually undergo modifications as the face of agriculture continues to change. Farm managers purchase crop and livestock insurance as a means of insulating themselves from environmental and economic shocks, predominantly related to production, price, and revenue variability. Yield variability exists due to the presence and uncertainty in weather, diseases, insects, and other pests, which subsequently triggers volatility in market prices (Gray, Richardson, and McClaskey, 1995). In addition to environmental factors, shocks to market supply and demand, both domestically and internationally, create heightened volatility in market prices. Given the previous scenario and the inherent inelastic demand of agricultural products, risk associated with price is further exacerbated. Historically crop and livestock insurance has provided valuable risk management by transferring production risk to insurance providers who are reinsured by the Risk Management Agency (RMA). Government programs implemented through the Farm Service Agency (FSA) provide a stabilizing mechanism and limit the degree and severity to which producers experience variability in

farm prices, yields/production, and income. Gray, Richardson, and McClaskey contend the transfer of risk to government stems primarily from, "the inherent instability of farms prices and income" which have been the leading motivators in justifying government intervention (1995).

According to the Insurance Information Institute, "crop insurance has become the largest single source of financial protection to farmers", which in 2005 insured nearly 250 million acres (2006). As legislation begins for the 2007 Farm Bill, many economists anticipate a transition from the traditional income enhancement approach to one focusing on and promoting risk management. Government spending on U.S. farm programs has shifted from primarily price supports to one focusing on risk management. In the future we can expect to see a greater reallocation of government spending toward programs targeting risk management.

1.2 History of U.S. Crop and Livestock Insurance Program

The Federal Crop Insurance Corporation (FCIC), an organization within the United States Department of Agriculture (USDA), first debuted following ratification of the Agricultural Adjustment Act of 1938. Their objective aimed to devise and implement an organization which promoted improvement of the agriculture sector through development of crop insurance. Furthermore the objective was to reduce individual losses associated with unavoidable perils through an actuarially sound risk management program. The Crop Insurance Act of 1980 set out to coordinate a partnership between private and public sectors. This partnership eventually led to the expansion of numerous county crop programs implemented through the private sector. It was through this partnership which allowed for the development of an efficient and effective program.

From 1981 to 1990 insured acres soared from a reported 45 million to 101 million attributed to cheaper insurance as a result of subsidies. Despite such success, disaster assistance ballooned in the 1980's attributed to severe droughts in '81, '88, and '89. Even with efforts to eliminate disaster payments congress has continually provided disaster assistance to farmers with recent notable outlays in 2003 and 2004. It was the Crop Insurance Reform Act of 1994 which mandated participation for eligibility for additional government payments (i.e. deficiency payments). Farmers were now offered the option of a catastrophic insurance coverage for a minimal administrative fee. Congress's goal for insurance to become the primary vehicle for providing assistance to farmers, away from ad hoc disaster assistance, was slowly becoming a reality as participation rates reached all time highs. More recently, under the provisions of the Federal Agriculture Improvement and Reform (FAIR) Act of 1996, RMA was assembled to execute and supervise programs authorized under FCIC. According to RMA, their mission is to, "Promote, support, and regulate sound risk management solutions to preserve and strengthen the economic stability of America's agricultural producers (RMA, 2005)." As of 2003, 22 RMA reinsured crop insurance plans existed, covering over 100 commodities and insuring 218 million plus acres. According to the RMA website, in 2005, just over 16.4 million acres were insured in Kansas, accounting for nearly 71% of total acreage committed to field and miscellaneous crops.

1.3 Yield Based Contracts

Yield based contracts dominated the insurance industry until the early 1990's. Multiple Peril Crop Insurance (MPCI) more recently referred to as APH, the longest running insurance design, provides comprehensive coverage of unavoidable perils and

other losses including but not limited to, costs associated with prevented planting, replanting, and late planting. These contracts provide protection for individual commodities. MPCI covers nearly 70 commodities with coverage levels from 50% to 85% with payout elections of 55% to 100% of expected market price. Indemnities are issued when harvested yield falls below the yield guarantee, determined by the producers Actual Production History (APH). APH is computed as a per acre average yield using a minimum of 4 and maximum of 10 consecutive crop years of past yields for the insured commodity. When less than four years of actual, temporary, and/or assigned yields are unavailable transitional yields are used in calculating average or approved APH yields. Low yields can be replaced with 60% of the transitional yield or farmers may select "yield cups" to limit reduction in the APH as result of multiple year losses. The yield guarantee is derived from the product of APH and producer chosen coverage level.

Another yield based contract, Group Risk Plan (GRP), is a management tool which determines losses based on a county index, irrespective of individual yields. GRP was introduced with hopes of addressing the inherent problems of adverse selection and moral hazard present in current insurance programs. Features of GRP include less paperwork, lower loss adjustment expenses, and lower overall administrative costs. When actual county yield of the insured commodity, published by National Agricultural Statistics Service (NASS) and approved by RMA, falls below the trigger yield, indemnities are issued in accordance with producer's elected coverage level ranging from 70% to 90% in 5% increments and selected protection level. The trigger yield or coverage level is derived by multiplying expected county yield and producer chosen coverage level. Protection level for GRP, selected by the producer, is equated by

multiplying the percent revenue coverage, 60% to 100%, and maximum dollars of protection per acre. Maximum dollars of protection is derived from the product of expected county yield, GRP price, and 150%.

1.4 Revenue Based Contracts

Up until the early 1990's, FCIC had sufficiently covered yield risk for many crops (under MPCI policies), however products addressing or associated with price risk did not exist. Federally insured crop programs endured a series of changes including the introduction of insurance designs protecting producers from low prices, low yields, or a combination of the two. Revenue insurance designs enabled producers to manage price and yields through the guarantee of a predetermined revenue level. Consistent with yield based designs, the following programs provide protection for individual commodities. Income Protection (IP) and Crop Revenue Coverage (CRC) were introduced in 1996 with Revenue Assurance (RA) debuting in 1997. Collectively these policies protect producers against revenue deficiencies attributed to unfavorable prices and yields. IP, developed by the USDA and based on APH, protects producers from reductions in gross revenue and distributes indemnities when gross revenue falls below the revenue guarantee. The product of APH yield, base market price, and coverage level, equates a producer's revenue guarantee. Producers can elect coverage levels from 50% to 75% in 5% increments. Individual gross revenue equals harvest or actual yield times harvest price.

Developed by American Agrisurance, CRC protects against low yields and low prices or a combination of the two. Following CRC provisions, indemnities will be disbursed when gross revenue falls below the revenue guarantee. The final revenue guarantee is calculated by multiplying producer APH by selected coverage level by the

higher of harvest price (which reflect market conditions at harvest time) or base price (determined prior to insurance purchase). Given the previous provision, CRC provides producers with upside as well as downside price protection. Coverage levels range from 50% to 85% in 5% increments. The producer's gross revenue to count equals the actual harvested yield multiplied by harvest price.

Iowa Farm Bureau developed RA, which similar to alternative revenue insurance designs, protects producers against unfavorable market prices and production shortcomings. Indemnities are received when the dollar value of production falls below the revenue guarantee. Per-acre revenue guarantee is the product of APH, higher of base price or harvest price, and the selected coverage level. Producers can select from a range of coverage for approved average yield from 65% to 85% in 5% increments. Following harvest, revenue to determine any payments is simply yield per acre multiplied by fall harvest price.

In 1999, Group Risk Income Protection (GRIP), recognized as the revenue component of GRP, debuted protecting producers on the basis of expected county gross revenue per acre of the insured commodity, irrespective of individual gross revenue. Producers receive indemnities when actual county gross revenue, computed by the product of actual county yield and harvest price, falls below some predetermined trigger revenue. Individual trigger revenue is equated by multiplying expected price, expected yield, and coverage level (ranging from 70% to 90% in 5% increments) of the insured commodity.

Introduced in 1999, Adjusted Gross Revenue (AGR) became the first revenue product insuring a percentage of average gross revenue for the entire farm. Currently

AGR is available in 18 states across the U.S however USDA has frozen further expansion of AGR. AGR provides coverage under one policy for multiple agricultural commodities. Motivation for AGR was to provide insurance based on current and historical tax records, specifically Schedule F 1040 filings or equivalent tax forms. With the use of federal tax records, RMA believes this approach will "reinforce program credibility by using IRS forms and regulations to ensure compliance (RMA, 2003)."

1.5 Livestock Insurance

The Agricultural Risk Protection Act (ARPA) of 2000 gave the green light to develop federally reinsured livestock products. Prior to the enactment of ARPA, livestock remained a sector effectively excluded from RMA risk management programs specifically insurance. November 15, 2001 marked FCIC approval of federally reinsured livestock products known as Livestock Risk Protection (LRP) for swine, fed cattle, and feeder cattle. The basis of LRP is to protect producers against falling market prices, below some predetermined coverage price. Key features of LRP include coverage levels ranging from 70% to 95% of expected ending value and the flexibility to purchase insurance coinciding with individual marketing periods and number of actual insured livestock. Indemnities are paid when actual ending value, a weighted average price of the insured livestock, reported by Chicago Mercantile Exchange (CME), falls below the chosen coverage price. Taking expected ending value, reported daily on the RMA website, and multiplying by producer chosen coverage percentage, establishes a coverage price protecting producers on a dollar per cwt basis.

Livestock Gross Margin (LGM) protects against producer shortcomings in gross margin which is simply livestock market value minus feed costs. Available coverage

levels range from 80% to 100% in 5% increments. Producers receive indemnities equal to the difference, between actual gross margin and guaranteed gross margin if positive. Actual gross margin is the product of total target marketings and actual gross margin of the insured livestock. Gross margin guarantee is derived by the product of expected total gross margin and chosen coverage level. Multiplying target marketings, as determined by the producer, by expected gross margin per livestock unit for each month and summing the values, equates expected total gross margin. Expected gross margin per livestock unit is established by subtracting expected feed cost, specified under LGM provisions, from the product of expected marketing month price, reported by CME, and marketing weight of the insured livestock.

1.6 Whole-Farm Revenue Insurance

In 2003, Adjusted Gross Revenue-Lite (AGR-Lite) was introduced. Designed with the parent program (AGR) in mind, this insurance program has a more simplified design continuing revenue protection for the whole-farm for all crop and livestock enterprises. AGR-Lite was first developed by the Pennsylvania Department of Agriculture and for 2007 is available for sale in 28 states (AK, AZ, CO, CT, DE, ID, KS, MA, MD, ME, MN, MT, NC, NH, NJ, NM, NV, NY, OR, PA, RI, UT, VA, VT, WA, WI, WV, and WY). Figure 1.1 illustrates those states which are approved to sell AGR-Lite.

To encourage participation, maximum total liability approved for AGR-Lite for insurance year 2006 was increased from $250,000 to $1,000,000. However, liability is still substantially less than the maximum liability currently offered by AGR ($6,500,000). One other distinctive feature of AGR-Lite was the elimination of the livestock restriction.

AGR limits the maximum share of livestock and livestock product revenue in the guarantee to 35% and AGR-Lite does not. Table 1.1 provides a comparison of the AGR and AGR-Lite programs. For further information on AGR and AGR-Lite refer to the following RMA websites:

- http://www.rma.usda.gov/pubs/2003/PAN-1667-06rev2.pdf
- http://www.rma.usda.gov/pubs/2003/PAN-1667-07.pdf

When comparing alternative insurance designs, AGR-Lite may be used as a standalone product or as an umbrella (wrap around) policy allowing producers to use AGR-Lite in conjunction with alternative crop insurance designs, excluding AGR. Farmer paid premiums for AGR-Lite will be reduced when producers purchase additional insurance products, which reduce total liability. However, a producer may not accumulate indemnities from all insured products in excess of the total value of their losses.

Limitations of AGR-Lite specify that a qualifying person can generate no more than 50% of their total revenue from commodities purchased for resale. An example would be the purchase of grapes to be converted into wine. Potato revenue must not exceed 83.35% of their revenue stream. It is important to note the resale limitation does not apply to commodities purchased for further growth, such as stockers, cattle backgrounded, and fed cattle.

Producers are able to select from three coverage levels (65%, 75%, and 80%) of average gross revenue with an indemnity payment rate of 75% and 90%. For 2006 virtually all producers will qualify for 65% and 75% coverage levels with a one commodity requirement. To qualify for higher coverage levels (80%), producers must

indicate on their intended agricultural commodity report that at least three agricultural commodities will be produced whose expected income will be greater than or equal to that determined by the diversification formula. The intended agricultural commodity report will be submitted at the beginning of each eligible insurance year and details the commodity, expected acreage, yield, expected value, and total value. The policy also requires that qualifying persons submit a minimum of five years of continuous, verifiable tax records for the same entity, preferably Schedule F 1040 filings or equivalent tax forms to document historical revenue and expenses.

To encourage participation in AGR-Lite RMA pays 59%, 55%, and 48% of the total premium for coverage levels of 65%, 75%, and 80% respectively. Calculations for revenue guarantee are derived from the lesser of the 5-year average gross revenue based on tax returns or the expected farm income times the producer's elected coverage level percentage. When a producer realizes a shortfall in gross revenue, below the guarantee level, an indemnity is paid based on the producers selected payment rate percentage.

AGR-Lite provides protection for otherwise uninsurable commodities such as organic and direct marketed production; provides farm operations with a bottom line from severe economic loss; provides individual protection based on personal yield, price history, plus low price protection; and finally it may provide an alternative for farms with reduced APH caused by multiple years of crop losses.

AGR-Lite possesses great potential in filling the voids or gaps in the current FCIC product line as this product caters to small, diversified, livestock, and specialty crop firms. Despite such potential, the market for AGR-Lite in approved states has struggled as the following will illustrate. In 2003 74 policies were sold with subsequent year sales

of 88 in 2004, 162 in 2005, and an unofficial 348 in 2006. Refer to Figure 1.2 for a breakdown of crop insurance activity for 2005 production year. Furthermore Table 1.2 provides a numerical summary of liability by insurance design. Reasons or speculations for such stagnant sales include the initial maximum liability of $250,000 which has since been raised to $1,000,000. Furthermore, in a statement by Keith Collins, Chief Economist at the USDA argues that poor participation levels may be attributed to, "the learning curve of a financial product as compared to a production agricultural type of insurance product, as well as the cost of delivery (2005)." Since its debut in 2003, AGR-Lite has undergone several revisions and in light of recent complaints, will continue to do so.

1.7 Research Objective

According to NASS census data for 2002, Kansas's top six commodities (by production value) account for $8.65 billion or 98.8 percent of the state's agricultural production. However, only one of these commodities is currently insurable: Grains, $2.1 billion attributing to 24 percent of Kansas's agricultural production. The uninsurable commodities in the top six (by production value) are cattle and calves, $5.7 billion; hogs, $297.5 million; milk and other dairy, $248.5 million; hay and other production, $225 million; and nursery and greenhouse, $55.5 million. These uninsurable commodities account for $6.55 billion or over 74 percent of agricultural production currently without risk protection. These statistics further substantiate the need for analysis of AGR-Lite in Kansas agriculture.

Given the previous statistics, the objective of this research is to establish the impact of participation in AGR-Lite for SE Kansas farms on income variability.

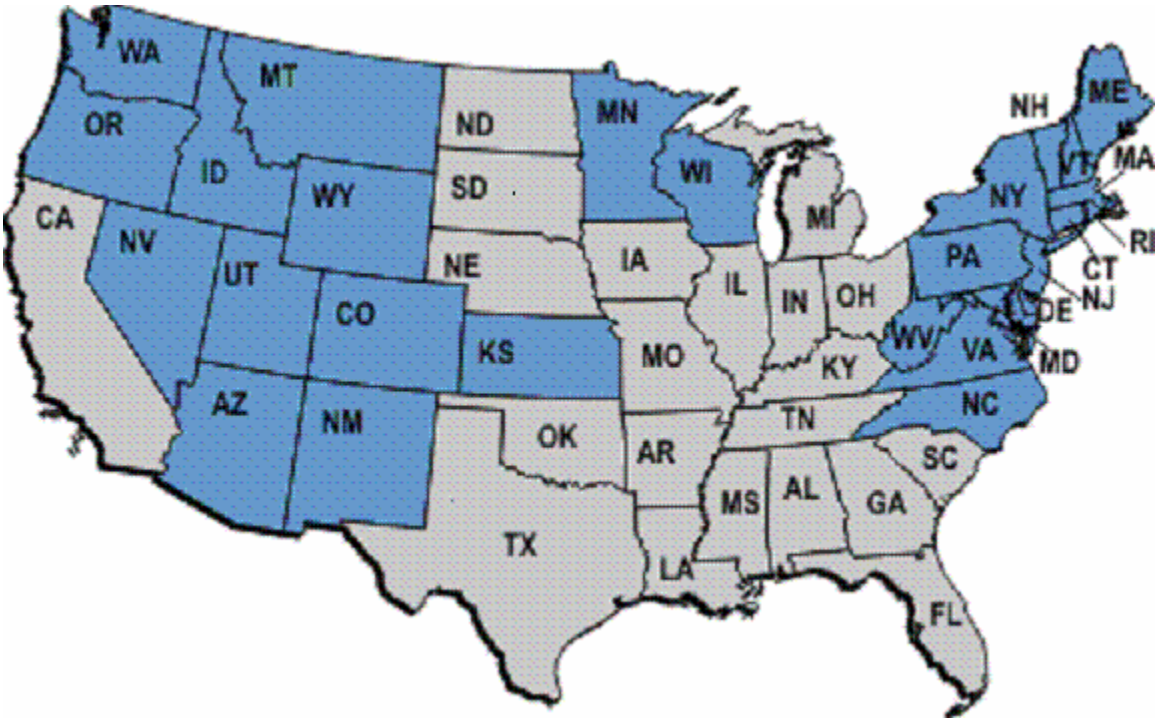
Potential risk reduction associated with AGR-Lite will also be estimated. Five categories of farms are used to examine the impact of AGR-Lite on adjusted gross revenue to count (AGRC) and net farm income (NFI) variability. Categories used for analysis include all farms, crop farms, livestock farms, beef farms, and dairy farms. The farms were placed into each category if they averaged 50% or more of total income from crop, livestock, beef, or dairy over the 13 years. The Kansas Farm Management Association (KFMA) data was used to compile 13 years (1993-2005) of continuous farm level data that was used to evaluate participation in AGR-Lite. The primary objective of this study evaluates individual farm performance assuming farms participated in AGR-Lite. A more detailed and specific list of objectives for this study follow:

1. Establish an area of study, study period, and compile a panel data set of farm level data
2. Determine farm type categories for analysis.
3. Summarize the trend in the data for selected income variables.
4. Formulate a mathematical representation of the AGR-Lite policy.
5. Define procedures to estimate actuarially fair premiums that correspond to the policy.
6. Identify risk analysis procedures and statistics for comparison including standard deviation, Coefficient of Variation (CV), minimums, maximums, Downside Risk (DR), and Certainty Equivalents (CE).
7. Identify data limitations that caused revision of the procedures to calculate the income distributions with and without participation in AGR-Lite.
8. Estimate gross and net income distributions with and with out the AGR-Lite policy under three premium calculation procedures.
9. Compare the previously identified statistics from the estimated distributions to determine the overall impact of AGR-Lite by farm category as well as Value of Farm Production (VFP) levels for crop farms, over all farms and farms with claims.

1.8 Chapter Outline

An outline describing the remaining contents of the thesis will follow. Chapter 2 reviews prior literature which has analyzed many of the current Federal Crop Insurance Corporation programs and their effectiveness at mitigating risk. Chapter 3 describes the data, methods, and assumptions used to conduct the analysis. Chapter 4 presents the results of the analysis. A brief summary of findings, research limitations, discussion of future research and concluding comments are presented in Chapter 5.

Figure 1.1 States approved to sell AGR-Lite for 2007



Note: Shaded states indicate areas in which AGR-Lite has been approved for sale.

Table 1.1 Comparison between AGR and AGR-Lite policies

	AGR*	AGR-Lite
Maximum Liability	$6,500,000	$1,000,000
Animal and Animal Product Limit	35%	N/A
Purchased For Resale[1]	<50%	<50%
Coverage Level (%)[2]	65, 75, 80	65, 75, 80
Payment Rate (%)	75, 90	75, 90
Government Subsidy (%)[3]	48, 55, 59	48, 55, 59

[1]Producer must not generate more than 50% of gross income from resale commodities. This does not include commodities purchased for further growth.

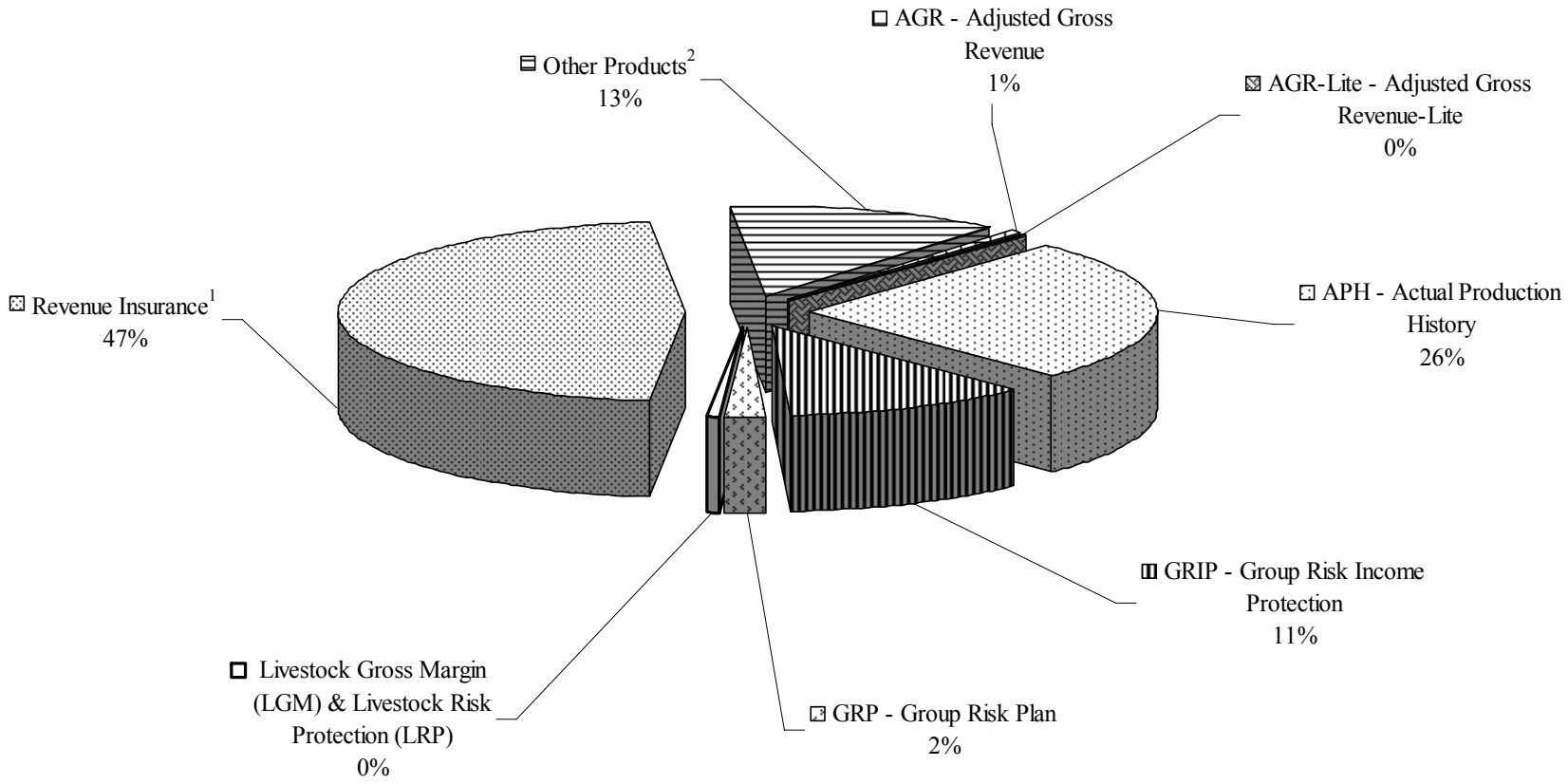
[2]There are minimum commodity requirements for each of the coverage level percentages. Each commodity must generate a percentage of the total revenue stream. Refer to RMA fact sheets for further information.

[3]Government subsidy levels are 48%, 55%, and 59% for coverage levels of 80%, 75%, and 65% respectively

*AGR is currently unavailable in Kansas and will not be available in the succeeding crop year

Note: Adjusted Gross Revenue (AGR), Adjusted Gross Revenue-Lite (AGR-Lite)

Figure 1.2 Percent of dollar coverage across federally insured designs for 2006



Source:USDA, RMA at http://www3.rma.usda.gov/apps/sob/current_week/insplan2006.pdf and http://www3.rma.usda.gov/apps/sob/current_week/lpi_insplan2006.pdf

Table 1.2 Summary breakdown of liability by insurance design for 2006

Insurance Plan	Liability
AGR - Adjusted Gross Revenue	$293,767,147
AGR-Lite - Adjusted Gross Revenue-Lite	$57,072,794
APH - Actual Production History	$12,950,628,237
GRIP - Group Risk Income Protection	$5,733,025,928
GRP - Group Risk Plan	$1,051,980,975
Livestock Gross Margin (LGM) & Livestock Risk Protection (LRP)	$189,561,978
Revenue Insurance[1]	$23,466,898,287
Other Products[2]	$6,331,318,483
Total	$50,074,253,829

[1]Other Products Include: Aquaculture Dollar (AQU), Avacodo Revenue Coverage (ARC), Dollar Plan (DOL), Indexed APH (IAPH), Income Protection (IP), Indexed IP (IIP), Pecan Revenue (PRV), Tree Based Dollar Amount (TDO), Yield Based Dollar Amount (YDO)

[2]Revenue insurance combines liability from Revenue Assurance (RA) and Crop Revenue Coverage (CRC).

Source: USDA, RMA at http://www3.rma.usda.gov/apps/sob/current_week/insplan2006.pdf and http://www3.rma.usda.gov/apps/sob/current_week/lpi_insplan2006.pdf

CHAPTER 2 - Literature Review

2.1 Introduction

Exploring the use of crop insurance as a risk management instrument and its significance in the agricultural industry has been widely researched. With concerns from taxpayers regarding the costs of such safety net programs and increasing levels of subsidization, there has been a renewed interest in evaluating performance of insurance designs and their effectiveness as risk reducing mechanisms. Section 2.2 and 2.3 review literature focused on performance of revenue based, as well as individual and area yield designs using farm level performance measures. Section 2.4 reviews literature conducting cross comparison analysis between yield and revenue based schemes. Each section will provide detail on the methods employed in capturing the effectiveness and efficiency of federally endorsed insurance mechanisms and discuss significant findings of each.

2.2 Revenue Based Designs

Prior to presenting literature which analyzed revenue based designs, the following section discusses an article from Dismukes and Coble (2006) which contends revenue insurance may be more effective in risk management compared to alternative methods.

Since introducing revenue based designs in 1996, participation has surpassed yield based designs covering over 57% of insured acreage. Figure 2.1 illustrates the transition from traditional yield based coverage to revenue based from 1996 to 2006. One key driver contributing to increased participation has been government subsidized

premiums. According to Dismukes and Coble (2006) government paid subsidies for revenue insurance in 2006 totaled $1.8 billion, exceeding producer paid premium by $400 million. Revenue insurance provides coverage for intra-season not inter-season, thus guarantee levels will more accurately reflect market conditions, ultimately limiting the presence of market distortion.

Unlike yield based designs, revenue oriented programs, according to Dismukes and Coble (2006), can be more effective as an income stabilizer due to the inherent characteristics of the design. First, it provides protection from loss in revenue rather than price or yield. Secondly revenue based designs are larger in scope in that dissimilar from individual designs, which only provide protection for individual segments of agriculture, revenue insurance establishes a common denominator regardless of farm composition.

Despite attractive features detailed above, Dismukes and Coble (2006) contend revenue insurance likely fails to offer "adequate coverage" as perceived by policy developers and farmers. First, unlike yield insurance, revenue products combine risks associated with yield and price, and given the highly negative correlation observed with price and yield; revenue insurance offsets the risks resulting in less variability leading to less frequent and often smaller indemnities. As such, producers often prefer purchasing separate insurance protection. Secondly, insurance often requires the insured to absorb a portion of the loss which, again, leads to the notion of "inadequate coverage" because the full value exceeds the coverage level. Lastly, is a problem that has confounded many, multiple year declines in income, to which individual and whole-farm products alike have failed to address. Multiple year declines have become the central source of contention for farmers and policy makers alike.

Gray, Richardson, and McClaskey (1995) investigated and compared the 1990 Farm Program, supporting agricultural prices through deficiency payments, acreage reduction, set-asides, and CCC loans, to two alternative schemes separate from the 1990 Farm program which proposed the following; 1) eliminate deficiency payment programs, federal crop insurance, and disaster assistance programs, 2) retain CCC non-recourse loans and Farmer-Owned reserve, and 3) eliminate all forms of acreage reduction or set-asides. These alternative schemes, developed by an Iowa Farm Bill Study Team, were called Revenue Assurance (RA) and protected producers through a guarantee of normal gross revenue at 70% and 90% coverage levels. These three alternative designs were then evaluated and compared for their effectiveness in stabilizing producer revenues and total government expenditure.

Producer gross return and government expenditure distributions were estimated through simulation models for each of the designs using eight representative farms across the nation. Estimated probability distributions enabled the authors to quantify producer support, stabilization, and government expenditures across programs. Producer gross revenue distributions were determined through Monte Carlo simulation. Ten years of national yield data were extracted to derive random national yields. In this study RA assumed protection for the whole farm, thus the process accounted for cross crop correlations within farms. Furthermore, simulations to derive correlations between national and producer yields where conducted via multivariate normal random generation (Gray, Richardson, and McClaskey, 1995). These results were then entered into a pricing formula which established a national average price. Taking national average price, multiplying by national yields, equated marketplace gross revenue. To quantify total

benefits from each design, gross revenue guarantee was computed, multiplying the five year moving average of price and yield for each crop, summing the observations, and multiplying by producer chosen coverage level (70% or 90%). Probability distributions were derived through 100 iterations for producer gross revenue and government expenditures.

Their findings suggested that across alternative designs, the 1990 farm program supported mean producer revenues higher in comparison to RA designs. Support for mean producer revenue, assuming 90% coverage were comparable to the level supported by the 1990 farm program. Further, Gary, Richardson, and McClaskey contend the 1990 farm program to be more effective in income stabilization when price variability constituted the principal risk confronted by the producer. On the contrary, RA provided greater income stabilization when primary revenue risk faced by producer was yield variability. When analyzing administrative costs, the 1990 farm program constituted the largest administrative outlay with 90% and 70% RA following respectively. Nationally, Gray, Richardson, and McClaskey argue, producers located in the Great Plains region (growing wheat and rice) suffer considerably under RA due to limited exposure to yield variability, resulting from irrigation and ample rainfall, and on average receive most if not all income support through components of the 1990 farm program. As for regions in the southeast and corn belt, comprised of mainly feed grain producers specifically soybeans and non-irrigated cotton, will benefit under the RA scheme, as producers receive little benefit from the 1990 farm program specifically soybean producers who received no income support under the 1990 farm program.

Hennessy, Babcock, and Hayes (1997), following the debut of revenue insurance, explored the effects of alternative revenue insurance designs to the 1990 commodity program, and no program alternatives. Specifically they investigated the effects of acreage allocations, administrative or government costs, and producer welfare across alternative policies using a representative corn and soybean farm from Sioux County Iowa.

Revenue insurance programs are broken down into individual and portfolio; then further characterized by farm or county level. These designs were then evaluated against one another for their resulting effects. The following comparisons were analyzed; revenue insurance to price and crop insurance; crop specific to portfolio designs employing state contingent approach; 1990 farm program to a no program alternative; crop specific to portfolio revenue insurance designs; and farm level revenue insurance to the 1990 farm program. Monte Carlo simulation with 5,000 iterations was used assuming prices follow a log-normal distribution and yields follow a beta distribution. The final analysis compared alternative revenue insurance designs for individual versus portfolio. Additionally producer risk preferences were assumed to be constant absolute risk aversion.

Results suggested two important findings, first, offering revenue insurance with 75% coverage reduced government expenditures to a fraction of that under the 1990 farm program; and secondly, results were conclusive that revenue insurance offered greater protection and increased benefit irrespective of upfront expenditures. Additional findings suggested revenue insurance generated greater returns to society in comparison to the 1990 farm program. Furthermore, certainty equivalent returns (CERs), which measured

the certain return (assuming zero-risk) a producer would trade for a larger return associated with some risk. Under farm and county level revenue insurance designs, assuming 100% coverage, CERs exceeded those relative to the 1990 farm program suggesting increased producer welfare or expected income. Government expenditures were the highest under farm level crop specific revenue insurance with 100% coverage; however alternative revenue insurance designs and coverage cost less than that under the 1990 farm program.

In 2000 Miller, Coble, and Barnett investigated and compared the effectiveness of a multi-crop insurance design to individual yield and revenue insurance designs for a representative Mississippi farm. They attempted to formulate a model guaranteeing aggregate gross revenue from multiple enterprises. Cotton, soybeans, and wheat were the commodities selected for analysis. Ten combinations in total were analyzed, three assumed 100% acreage devoted to each crop, with the remaining seven being divided across the three commodities (i.e. 50-50-0, 33-33-33, ect.).

Probability distributions were formulated, through re-sampling, via non-parametric bootstrap simulation. County yield and historical prices from 1956-1998 were obtained from NASS. Before modeling the effectiveness of multi-crop revenue designs, equations were formulated to capture the yield variability across enterprises, and are as follows:

$$(2.1) \quad y_{ti}^{f} = \bar{y}_{i}^{f} + B_{ii}(R_{ti}^{C} - \bar{R}_{i}^{C}) + B_{ij}(R_{tj}^{C} - R_{j}^{C}) + e_{ti}^{f}$$

where y_{ti}^{f} is the yield for crop i in year t for farm f, $\bar{y}_{i}^{f}$ is the mean yield for crop i on farm f, B_{ii} and B_{ij} are the interaction coefficients for crop i and county trend-adjusted crop i and j, R_{ti}^{C} and $\bar{R}_{i}^{C}$ are predicted county and mean county yields for crop i,

R_{tj}^C and R_j^C are predicted county and mean county yields for crop j, and e_{ti}^f are the residuals for the respective crop (Miller, Coble, and Barnett, 2000). To complete the yield simulation, farm yield deviations were equated, and following simplification, are equated as:

(2.2) $$y_s^f = R_s^C + \bar{d}^f + e_t^f$$

where y_s^f is the simulated yield for farm f, R_s^C is the simulated county yield, $\bar{d}^f$ is the mean difference of yield of farm f from county yield, and e_t^f is the residual for farm f in year t. Price yield relationships were equated to complete the final component required to conduct the multi-revenue simulation. Price relationships were also calculated for each crop. The subsequent equation is associated with crop i:

(2.3) $$P_{is}^1 = P_{is}^0 (1 + a_{ii}^p (\frac{R_{it}^C}{\hat{R}_{it}^C} - 1) + a_{ij}^p (\frac{R_{it}^C}{R_{it}^C} - 1) + \varepsilon_{it}^p)$$

where P_{is}^1 is the simulated price of crop i at harvest, P_{is}^0 is the simulated futures price at planting, a_{ii}^p and a_{ij}^p are the coefficients for deviation of county yield i from expected county yield for i and j, $\frac{R_{it}^C}{\hat{R}_{it}^C}$ is the county yield for commodity i divided by the predicted county yield for commodity i in year t, and ε_{it}^p is the residual. Using equations (2.1) and (2.3), the following revenue simulation is derived:

(2.4) $$MREV_s^f = \sum_i A_i P_{is}^1 y_{is}^f$$

where $MREV_s^f$ is the sum of revenues from multiple crops for farm f, A_i is acres planted of commodity i.

Using a non-parametric approach, risk reduction gains were analyzed and compared for Mississippi producers under yield, single crop revenue, and multi-crop revenue insurance designs. Certainty Equivalents (CE) were calculated, which again indicate the amount a producer would accept in lieu of some uncertain amount, and used to compare alternative insurance schemes. CE were calculated as followed:

$$(2.5) \quad CE_{sr} = (1-r)E(U_{sr})^{\frac{1}{1-r}}, r \neq 1$$

where CE_{sr} is the simulated CE with a risk aversion coefficient r, and $E(U_{sr})$ is a constant relative risk aversion utility function and was calculated as follows:

$$(2.6) \quad E(U)_r = \sum_{s=1}^{s} \omega_s \frac{W_s^{1-r}}{1-r}, r \neq 1$$

where ω_s is the initial wealth and W is the ending wealth.

Under each scenario, CE increased compared to the baseline scenario of production assuming no insurance. In some instances individual designs reported greater CE values than multi-crop designs, however Miller, Coble, and Barnett argue individual designs triggered indemnities with greater frequency compared to multi-crop schemes. All three insurance designs effectively eliminated the lower tails of revenue distributions; however, of alternative insurance schemes, multi-crop designs generated the smallest probability of low revenues.

In 2004 Gray et al. analyzed the 2001 farm program and crop revenue coverage (CRC) for what, if any impacts individual and combined mechanisms impose on the distribution of returns to land. Specifically two scenarios were analyzed, first, market returns combined with three other programs, Agricultural Market Transaction Act (AMTA) payments, Marketing Loan Payments (MLP), and Marketing Loss Assistance

(MLA) payments and secondly market returns augmented by AMTA, MLP, MLA, and CRC (Gray et al. 2004). Returns were evaluated for an Indiana crop farm operating a 50/50 rotation of corn and soybeans.

Conducting a stochastic simulation, multivariate distributions were derived for corn and soybean prices simulated in a multivariate lognormal distribution, corn and soybean yields simulated in a multivariate empirical distribution, and cumulative farm income simulated from a multivariate normal distribution. Using a budgeting model, distributions were derived under each scenario then compared against one another for their relative impact on returns to farm land. Additional criteria used in measuring impacts of alternative government payment mechanisms on the distribution of returns to land were certainty equivalents (CE). CE were calculated as follows:

$$(2.7) \quad CE = [(1-\rho)EU(X+\omega)]^{1/(1-\rho)} - \omega$$

where ρ is the coefficient of relative risk aversion, EU is the expected utility associated with a given return, X, and ω is the initial wealth (Gray et al. 2004). Assuming the power utility function form U follows:

$$(2.8) \quad U(\widetilde{X}+\omega) = \frac{(\widetilde{X}+\omega)^{1-\rho}}{1-\rho}$$

and $\widetilde{X}$ was derived

$$(2.9) \quad \widetilde{X} = [(1-\rho)EU(X+\omega)]^{1/(1-\rho)} - \omega$$

Cash prices were procured from Indiana Agricultural Statistics Service with futures prices compiled from Chicago Board of Trade.

In comparing the two scenarios, average return to land per acre without CRC was $80.50 and $79.39 after CRC was included in the risk reducing portfolio. To reconcile

the $1.11 difference (which reflected the cost of insuring) in average returns to land, including CRC increased the bottom dollar return from $39.49 (without CRC) to $68.65, a near $30 difference; and reduced the standard deviation from $46.61 to $41.73. Furthermore, an increase from 0.99 to 1.40 (with CRC) in skewness established the effectiveness of CRC in mitigating downward risk. For the simulated results, CE values suggested producers with greater risk aversion gained considerably compared to those associated with less risk aversion. For example, under scenario one, with no insurance assuming MLA payments, a producer with relative risk aversion of 0 observed a CE value of $16.92/acre, whereas producers with relative risk aversion 5 reported a CE value of $34.89/acre. Thus, risk reduction under MLA was more beneficial to producers with greater risk aversion. In the aggregate, producers receive greater benefits with increased risk aversion. Gray et al. contend that MLA, MLP, and AMTA, adequately removed the risk present in farming. With the addition of CRC, values were slightly higher, insinuating greater risk reduction; however the increase is minimal suggesting that previous programs removed a significant portion of farm related risk. More importantly, this research claimed that net benefits from CRC are lessened with participation in additional government programs.

2.3 Yield Based Designs

Patrick and Rao (1989) examined the impact MPCI imposed on performance of hog –crop farms in Central Indiana. Farms were categorized by debt to asset (D/A) ratios, low, medium, and high with corresponding levels of 20%, 40%, and 70% respectively. To reflect greater yield variability experienced by farmers relative to county yields, CV were increased by 25%, 50%, and 100% of mean yields. Additional

scenarios analyzed whether or not a producer purchased MPCI, and the impacts on after-tax net present value of family withdrawals and change in net worth (ANPV), present value of ending net worth of solvent iterations (PVNW), probability of net worth gain (probability PVNW is greater than initial wealth) (%NWG), and probability of survival (firm remains solvent for 10 year period) (%SUR). Three scenarios (MPCI assuming 1986 feedgrain and wheat program; a combination of MPCI, 1986 feedgrain and wheat program, and off farm income; or no coverage from either program) were selected and explored for the effects of increased yield variability on selected performance measures of farrow to finish hog-crop farms. Farms were further classified as having average gross farm income from $100,000 to $249,999, operated 360 acres, of which 160 is owned and 200 crop shared, and selected from corn, wheat, soybeans, or a combination of any sort.

Similar to Schumann et al. (2001), FLIPSIM was employed to investigate the impacts of various insurance designs. According to Patrick and Rao (1989), FLIPSIM is a recursive simulation model which incorporated an assortment of variables, including crop mix decisions, financial management, and marketing. Crop yield and prices were generated from multivariate normal distributions.

The first scenario analyzed the impacts of MPCI assuming 1986 feedgrain and wheat program. This scenario suggested that purchasing MPCI would in fact reduce the mean value of ANPV and PVNW under all D/A groups. Thus, participating in MPCI reduced ANPV which corresponded to a reduction in net farm income. Farm survivability remained 100% for medium and low D/A groups. For MPCI and no 1986 feedgrain and wheat program, performance measure values were collectively worse than when augmented by the 1986 feedgrain and wheat program. Here again farms in the low

to mid D/A groups had 100% survivability. Under almost every scenario ANPV and PVNW were reduced when farmer purchased MPCI. The last scenario which included MPCI, 1986 feedgrain and wheat program, and off-farm income, suggested that an additional $12,000 of off-farm income increased ANPV, PVNW, %NWG, and %SUR under 40 and 70 percent D/A positions. Similar to previous results, ANPV and PVNW were reduced under 40% and 70% D/A with off-farm income and CV increases. Patrick and Rao concluded that for a diversified farm, as used in the study, MPCI played a trivial role in risk management due to areas of low yield variability, as is the case for Indiana hog-crop farm. In addition, participation in MPCI reduced net farm income and PVNW under a high D/A group; however engaging in MPCI yielded a positive response, albeit net farm income still declined, yet at a much smaller percentage. It is under the medium D/A group which MPCI participation has the potential to be effective. These groups benefited from increased liquidity, increased %NWG, and higher mean ANPV and PVNW values, especially under increased CV. Patrick and Rao contend that MPCI is an effective risk management tool for producers with medium D/A levels or high D/A levels with off farm income, primarily those with greater yield variability.

Miranda (1991) reevaluated area yield crop insurance, first promoted by Halcrow in 1949, questioning the effectiveness of the design in reducing yield risk with individual yield design comparisons. Furthermore, an investigation was conducted which analyzed variation across producers and techniques to optimize coverage under area yield designs. Recall that under the area yield scheme, producers will receive indemnities when area yield falls below some predetermined critical yield. Miranda discussed the theoretical aspect of area yield insurance, then, applied this framework through farm level data from

102 western Kentucky soybean farms. Although he provides no economic analysis, his discussion specifically addresses the effectiveness of these designs in yield risk reduction. He also contributed a theoretical approach which was used in other crop insurance analysis.

To test the effectiveness of an area yield design, Miranda developed a model to measure the correlation between an individual farmer's yield and area yields:

(10) $\tilde{\gamma}_i = \mu_i + \beta_i(\tilde{\gamma} - \mu) + \tilde{\varepsilon}_i$

where $\tilde{\gamma}_i$ is the individual farm yield, μ_i is historical average farm yield, $\beta_i = Cov(\tilde{\gamma}_i, \tilde{\gamma}) / \sigma^2_{\tilde{\gamma}}$; $\tilde{\gamma}$ is the area yield; μ is the average area yield; and $\tilde{\varepsilon}_i$ is the nonsystematic component. β_i, which has a central tendency to one, established whether or not area yield designs were risk reducing. The greater the β_i the higher the probability area yield designs were risk reducing. Furthermore if β_i is greater than some critical β, β_c, area yield is deemed risk reducing. β_c were calculated as follows:

(11) $\beta_C = -\dfrac{\sigma^2\tilde{n}}{2 * Cov(\tilde{\gamma}, \tilde{n})}$

where $\sigma^2\tilde{n}$ is the variance of the indemnity under area yield insurance (Miranda, 1991).

Individual yield risk, according to Miranda, can be decomposed into systematic and unsystematic components. Factors which affected producers in a selected area are captured within the systematic component while nonsystematic components are the residuals. Individual yield insurance is plagued by inherent problems of moral hazard and adverse selection. Thus, Miranda asserted, individual yield insurance is less effective due to such steep deductibles. Area yield insurance, on the other hand, is more effective as problems of moral hazard and adverse selection are limited. Results suggested that on

average area yield designs offer greater yield risk protection compared to individual yield contracts. Additional results suggested, percent yield variability reduction under individual yield, full coverage area yield, and optimal area yield coverage designs are 30.8, 22.4, and 39.1 respectively. Individuals with the highest β coefficients sustained the greatest risk reduction under optimal area yield coverage, whereas those producers associated with the highest yield variances observed the largest reduction when an individual yield design was purchased.

Also in 1991, Carriker et al. explored and compared the effectiveness of individual versus area yield designs and examined if any reduction existed in the variability of yield-equivalent and gross income. Farm level yield data for 98 dryland corn farms and 38 dryland wheat farms from south central and northeast Kansas respectively, were analyzed.

Distributions for yield-equivalents and income were estimated for five alternative risk management designs (individual and area yield insurance, optimal coverage area yield insurance, and disaster assistance for farm and area yield) to evaluate their risk reduction effectiveness. Coefficient of Variation (CV) statistics were computed for yield-equivalents and gross returns for both commodities, across all farms, under each safety net alternative, then compared to the baseline of yield equivalents and gross returns assuming no insurance or disaster assistance. Cross comparisons allowed them to capture the realized reduction across safety net designs in reference to yield equivalents and gross returns. As effective as CV statistics are, they were limited by the expected value-variance criteria, thus Carriker et al. employed second-degree stochastic dominance

which enabled the comparison of possible incomes across strategies, identifying which designs offered the greatest overall benefit to producers.

Under yield-equivalent variability, individual yield insurance proved most effective in reducing variability, averaging 41.9% to 48.7% across corn and wheat respectively. Optimal coverage area yield insurance was the second most effective plan whereas disaster assistance designs failed to provide effective risk reduction for yield-equivalent.

Despite less relative risk associated with gross income, individual farm yield insurance without government payments yielded the highest average reduction, 19.8% and 47.1% for wheat and corn farms respectively. Farm yield disaster assistance, less effective than individual farm yield insurance, yielded a 26.9% and 2.8% reduction on corn and wheat farms respectively. As expected, when insurance designs were augmented by deficiency payment programs, variability in gross income was considerably less than under insurance alone.

Stochastic dominance analysis found individual farm yield insurance was preferred for risk averse wheat producers; however corn producers were indifferent between farm disaster assistance and individual farm yield insurance, without the presence of deficiency payments. Alternatively, when deficiency payments were used in conjunction with insurance, both corn and wheat producers equally prefer individual farm yield insurance.

In 1993 Williams et al. studied two crop insurance designs, two disaster assistance designs, crop insurance with a government commodity program design, and a government commodity program for their respective effectiveness at risk reduction

associated with net returns. Farm level data from 45 southcentral wheat and sorghum grain producers and 36 northwest wheat producers in Kansas were used to conduct the analysis. Unlike the study conducted by Miranda (1991), Williams et al. addressed net returns and government program effects. They also studied the effectiveness of these programs across alternative risk aversion coefficients and subsidized levels, dissimilar from Carriker et al (1991).

Analysis for net returns under alternative safety net schemes and various risk attitudes were conducted via stochastic dominance. More specifically Williams et al. used stochastic dominance with respect to a function (SDRF) criteria which analyzed the net return distributions for each scheme and allowed the ordinal ranking of alternative designs based on producer preference. Net return distributions were generated from price and yield data from 1978-1987, converted to constant 1990 dollars with USDA index. Whole-farm risk aversion coefficients were used to appraise net returns for farms in southcentral and northwest Kansas.

In 1990 dollars per acre, government commodity program (GCP) and disaster assistance both individual (DIS) and area (ADIS) generated the highest mean average net returns. Furthermore these strategies provided the lowest relative variability, measured by coefficient of variation statistics, compared to alternative strategies. Stochastic dominance results suggested (GCP + DIS) and (GCP + ADIS) were dominated the least number of times by alternative schemes across various risk categories in southcentral and northwest farms. As risk preferences encountered greater risk aversion, specifically moderate to strong, GCP + CI had the largest impact on southcentral grain sorghum farms. Assuming moderate risk aversion, individual strategies were evaluated and

compared against one another. GCP + ACI were preferred for grain sorghum, and wheat and grain sorghum combinations for southcentral and northwest wheat over GCP + CI on 78%, 66%, and 47% of the farms respectively. GCP + CI were selected on 36% of southcentral wheat farms as opposed to 33% who selected GCP + ACI. The final SDRF analyzed GCP + CI versus GCP + ACI with varied subsidization levels (10%, 20%, and 30%) to establish the preferred strategy. When both policies assumed total cost (no subsidization) GCP + CI was the preferred product for all regions and risk aversion categories with the exception of those growing wheat in southcentral Kansas with moderate risk aversion. With increased subsidization GCP + ACI became the preferred design across most regions and risk aversion categories. For moderately and strongly risk averse grain sorghum producers in southcentral Kansas, GCP + CI was the dominant product selected regardless of the increased subsidization of GCP + ACI.

More recently Atwood, Watts, and Baquet (1996) explored profitability, capital structure, and financial longevity for High plains wheat producers, and what, if any impacts alternative federal programs imposed on financial measures. Consistent with previous studies was the use of portfolio risk management and analysis focused on intermediate to long-run solutions. This study selected three federal crop insurance programs to analyze (no insurance, MPCI, and MPCI with actuarially fair premiums) and three price support programs (no price support, declining price supports, and constant real price supports).

Assuming an individual maximized the expected terminal net worth, subject to financial constraints, stochastic dynamic programming incorporating risk associated with yield, price, and financial was employed for this study. Estimated yield and price

distributions were constructed using 73 years of annual wheat prices compiled by the Montana Agricultural Statistics Service.

Results are presented and broken down into four key findings which will be discussed in turn. First, actuarially fair insurance imposes little impact on viability of the individual firm. Increases in subsidization will likely extend the survivability of the individual firm as producers are more inclined to engage in adverse selection. Secondly, producers will select insurance over price supports when the loading charge is less than five percent. Loading charges refer to additional amounts included in the base premium calculation and can include any costs deemed necessary to arrive at an actuarially sound premium. Furthermore, Midwest states realized increased sensitivity to nonactuarial loading as many producers chose to diversify their risk reducing portfolios by increasing the number of entities. Thirdly, similar to Williams et al. and Carriker et al., crop insurance and price supports are substitutes in risk reduction. If price support programs exist, MPCI imposes minimal impacts on firm survivability. Lastly, a producer is more equipped to service increased debt loads with the presence of insurance, meanwhile observing very little change in risk exposure.

In 1998 Wang et al. measured the performance of individual yield and area yield insurance designs. Specifically they analyzed farmer participation and welfare using an expected utility framework. Farmer welfare is defined as, "a willingness to pay measure, calculated as the amount of sure income that must be provided to the farmer in the case where no risk management instruments are available, in order to generate the same level of expected utility achieved under optimal use of the specified risk management portfolio (pp. 812)". Similar to other studies, Wang et al. included portfolio management in which

producers were able to participate in alternative risk management strategies including but not limited to futures and options. Analysis of a portfolio framework is important as these options influence a producers' decision to participate in a given insurance design.

Using a representative corn farm in Iowa, stochastic simulation and numerical optimization were employed to analyze risk management behavior. Two periods, planting and harvesting, were incorporated into the model, the first captured the selection of risk management decisions while the latter determined profit. Farmers were assumed to maximize expected utility of profits which were derived via von Neumann-Morgenstern utility function (u(.) represents the income from an uncertain prospect) which assumed constant relative risk aversion

$$\max_{x} \int_0^{\infty} \int_0^{\infty} u[\pi(p, y; x)] g(p, y / \Omega) dp dy \tag{12}$$

where $u(\cdot)$ is an increasing and concave von Neumann-Morgenstern utility function, $\pi(\cdot)$ is a per acre profit function, p is a random price vector, y is a random yield vector, x denotes a portfolio of risk management instruments, and $g(\cdot / \Omega)$ is the joint density for prices and yields conditioned on Ω, a set of information available when x is chosen (Wang et al. 1998). Price and yield distributions were estimated through a bivariate ARCH model which used weekly cash and future prices (May 1989 to April 1994) compiled by the Agricultural Extension Service at Iowa State University. Joint distributions were formulated for harvest cash price, futures price, individual farm yield, and county yield and forecasted for the 1994 -1995 crop year.

Individual farm yield crop insurance yielded higher efficiencies in managing yield risk compared to area yield designs, attributed mainly to inherent problems of adverse selection and moral hazard. Such problems lead to increased premium loading, whereas

area yield designs historically experience fewer problems with moral hazard and adverse selection, thus resulted in lower premium loading and a more actuarially sound premium. When confronted with high levels of yield basis risk, individual yield designs are preferred as producers were able to manage yield risk with greater efficiency relative to area yield designs. Yield basis risk is defined as, "the less-than-perfect correlation between the individual farm yield and the area yield index (Wang et al. pp 808)." Premiums were found to have influenced the efficiency and effectiveness of an insurance design. Results suggested a negative correlation with individual designs; as premiums decrease, performance of individual designs increased vis-à-vis area yield. Given the previous conditions, area yield designs outperformed individual designs when premium loading exceeded 35% and trigger yields were eliminated. Under an actuarially fair premium assuming no trigger yield constraints, individual yield contracts were the preferred choice attributed exclusively to yield basis risk inherent in area yield designs.

2.4 Cross Comparison Insurance Designs

Schumann et al. (2001) explored alternative safety net programs, prescribed by FCIC, and analyzed economic impacts on Southern producers. Catastrophic (CAT) coverage, MPCI, Whole Farm Revenue Program (WFRP), and Farm and Ranch Risk Management (FARRM) accounts were incorporated in a simulation model developed by Richardson and Nixon (2000), Farm Level Income and Policy Simulation Model (FLIPSIM). Under the Tax Relief Act of 1998, FARRM allowed the deferment of taxes up to 20 percent of net income for up to five years. If selected, a portion of income was deposited in an interest bearing account for a maximum period of five years. Over the course of time producers could make withdrawals to level income distribution in

unfavorable years. FLIPSIM permitted simulation of a diverse crop selection across insurance schemes including performance variables which assisted in capturing the economic impacts of respective designs.

Safety net designs were evaluated for fourteen grain, cotton, and rice farms, procured from the Agricultural and Food Policy Center (AFPC) from 2000 to 2005. Texas Northern Plains, Central Missouri, and South Carolina were selected as representative grain farms; cotton producers were comprised of Texas Southern Plains and Tennessee farms; and Texas and Arkansas were representative rice farms. Prior to conducting the analysis Schumann et al. (2001) created a series of assumptions; producers in 1996 are assumed to have 20% debt; prices, yields, and policy values used in the simulation were assembled from 1996 to 1999; and farmers used no risk management strategy over those years. Ten years of historical yields for representative areas were simulated in multivariate empirical distributions to establish a benchmark or baseline.

Evidence suggested that six of the seven safety net designs increased net cash farm income (NCFI) and sustained or improved standard deviations relative to the benchmark. Keep in mind this study analyzed safety net programs with premiums excluded, thus the following analysis will present income increases as a result of insurance participation. Furthermore, the nature of insurance is to serve as a risk management tool not an income generating instrument. South Carolina grain farms NCFI benchmark was $311,550, under MPCI 75% coverage, NCFI increased to $350,860. WFRP with 90% coverage followed closely, generating $350,270. Tennessee grain farms enjoyed the most considerable increase under WFRP at 90% level which increased

NCFI from a $41,050 base to $160,300. Across selected farms, WFRP 90% coverage yielded the greatest average increase in NCFI, followed closely by MPCI with 75% coverage.

Another financial measure, equity position of representative farms, was percent change in Real Net Worth (RNW). Results coincided with those of NCFI in that each safety net increased RNW vis-à-vis the baseline. WFRP with 90% coverage generated the greatest benefit, slightly more than MPCI with 75% coverage.

The final evaluation analyzed certainty equivalents (CE) which measured the value at which a risk averse producer required compensation to accept the average NCFI baseline, and forgo participation in alternative safety net designs. Consistent with previous conclusions, WFRP 90% coverage and MPCI 75% coverage generated the highest values, indicating these safety nets were perceived as possessing the greatest benefit to producers. Alternative policies of WFRP 80% coverage, MPCI 65% coverage, and MPCI 50% coverage varied depending on farm composition. Whether a producer selected MPCI or WFRP greatly depends on farm structure, number of farm enterprises, safety net coverage levels, size of farm, and income level (Schumann et al., 2001). FARMM accounts were not mentioned in the results simply due to their negative impact on net income stream. We would expect FARMM accounts to perform poorly; ultimately as farmers' increase deposits NCFI will decline. Similar results were discovered by Llewelyn et al. (2003) which explored the impact of FARMM accounts on net income and variability in a more detailed framework.

Using 9 years of continuous farm level data, Llewelyn et al. conducted an analysis using SAS and Microsoft Excel to analyze the impacts of FARRM accounts. As

expected when a farmer removes a percentage of income and makes a deposit into a FARRM account, net income declines. However, deposited income increased the farms cash asset value. As a whole, FARRM accounts decreased net income variability analyzed through standard deviations. Removing crop insurance effects suggested crop insurance participation increased net income and reduced overall variability with and without FARRM account use. Coefficient of variation statistics were derived under each scenario, the lowest values were associated with those producers engaged in FARRM accounts and crop insurance.

In 2003, Schnitkey, Sherrick, and Irwin used net costs, values-at-risk (VaRs), and certainty equivalent returns (CERs) to evaluate alternative crop insurance mechanisms and their impact on producer gross revenue with consideration for various levels of coverage and yield variability. Products evaluated include APH, RA with base price option (RABp), RA with harvest price option (RAHp), GRP, and GRIP.

Gross revenue distributions, totaling 26, were generated for each of the available coverage levels, 65% to 85% in 5% increments for APH, RABp, and RAHp and 70% to 90% in 5% increments for GRP and GRIP for a representative Illinois corn farm for the 2000 production year. Based on previous research and preliminary simulations, Weibull distributions were selected for analysis. Price distributions were formulated assuming a lognormal distribution. County level corn yields were compiled from NASS from 1972 to 2002. In an attempt to accurately capture true variability of farm yields, 4,417 farms were analyzed from the Farm Business Farm Management data set and used to rescale the distributions. Lastly, distributions were compiled allowing for correlations between

variables. Specifically correlation distributions were generated for farm to county yield and harvest price to yield.

As expected, net costs were higher under farm-level products compared to that of county-level products and are sequenced from least to most expensive, GRIP, GRP, RABp, RAHp, APH. Evaluation of CERs reveals that on average Illinois farmers classified with relatively low risk aversion will select county-level designs, whereas farm level designs were preferred when pooled by relatively high risk aversion. Under VaR measures, results suggested that $VaR_{.05}$, (which equals 5% VaR with insurance product minus 5% VaR with no insurance) demonstrated the greatest change from the base of $238. For example, RAHp yielded a $24.47/acre increase from the $VaR_{.05}$ base of $238, which conveyed substantial risk reduction. Furthermore, positive VaR values indicated the insurance design increased revenue at a determined level. So, $VaR_{.05}$ referred to revenue on the cumulative distribution with a 5% probability, constituting an event with a relatively low likelihood of occurrence.

Figure 2.1 Acres insured under yield and revenue insurance designs from 1996 to 2006

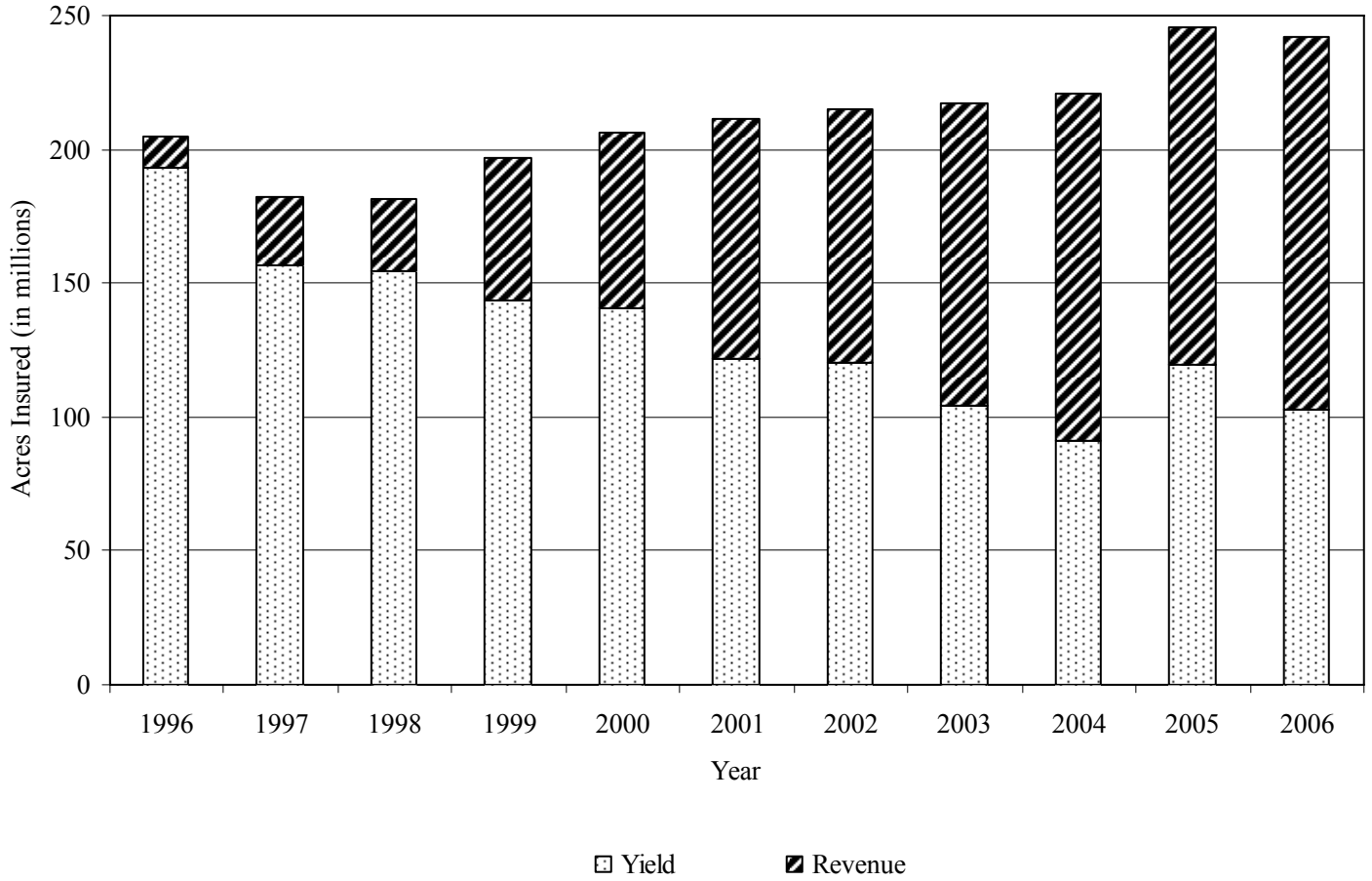


Table 2.1 Summary of findings from literature review

Author	Results
Patrick and Rao (1989)	MPCI may play a limited role in risk management of diversified farms in areas of relatively low yield variability. Effectiveness of MPCI depends heavily on the financial position of the firm and the extent of yield variablilty. MPCI possesses greater potential as a risk management tool for medium debt farms vis a vis those categorized as high and low.
Miranda (1991)	On average area yield designs offer greater risk protection compared to individual designs. Optimal area yield coverage provided greater percent yield variablility reduction at 39.1%. Producers associated with the highest yield variances recieved greater yield risk reduction under individual designs.
Carriker et al. (1991)	Individual farm yield insurance proved most effective in yield variability reduction for both corn and wheat farms. Gross income variability with and without deficiency payments provided the greatest benefit through individual farm yield insurance designs compared to no coverage for both corn and wheat farms. Stochastic dominance analysis confirmed the effectiveness of individual farm yield insurance.
Williams et al. (1993)	Disaster assistance designs (which come at no cost to producers) were preferred to crop insurance for wheat and sorghum grain producers across various degrees of risk aversion. Individual crop insurance designs were preferred to area yield, however depending on the risk source, a producer may select area yield over individual. Individual yield insurance was preferred for producers growing grain sorghum and wheat in southcentral and northwest Kansas, areas associated with higher yield risk.
Gray, Richardson, and McClaskey (1995)	1990 Farm Program supported revenues at the highest levels, and were most effective when the principal risk source was price variability. This program also generated the largest administrative cost. RA provided greater stabilization when the primary revenue risk source was yield variability
Atwood, Watts, and Baquet (1996)	Analyzed farm price support and crop insurance programs. Price supports and crop insurance are substitutes in risk reduction. Due to subsidization, insurance has an impact on firm survivability. Producers select insurance over price supports when loading charges are less than 5%. Insurance participation increased as producers ability to service debt increased.
Hennessy, Babcock, and Hayes (1997)	Revenue insurance at 75% provided comparable coverage relative to the 1990 commodity program, however at a fraction of the 1990 commodity program cost. Revenue insurance generated greater returns confirmed through CERs.
Wang et al. (1998)	Examined relative performance of individual and area yield designs. Individual farm yield designs are better suited at managing farm yield risk relative to area yield designs. In addition producers who face relatively high levels of yield basis risk find greater risk reduction under individual designs compared to area yield.
Miller, Coble, and Barnett (2000)	All three insurance designs (multi-crop revenue, single crop revenue, and yield insurance) effectively eliminated the lower tails of revenue distributions; however, of alternative insurance schemes, multi-crop designs generated the smallest probability of low revenues. Single revenue designs resulted in the largest average CE increases, however rather marginal compared to the multi-crop design. This due to single crop generating claims more frequently compared to multi-crop.
Schumann et al. (2001)	Most safety net designs provided risk reduction and income support. WFRP 90% coverage generated the largest benefit for income and risk reduction in 10 of the 14 farms. Subsequently MPCI at 75% and 65% coverage provided the second and third highest levels. MPCI benefits producers income and lowers risk moreso when in the presence of increased subsidization. WFRP has potential to generate considerable benefits to producers especially with low premiums.
Schnitkey, Sherrick, and Irwin (2003)	Farm level revenue insurance designs effectively eliminated low revenues in low probability events. However events which occur with inreased regularity may prefer county designs instead. County level products were preferred by producers with less risk aversion and a desire for increased returns.
Gray et al. (2004)	Average return per acre was less when CRC included. However bottom dollar return increased considerably and abosulte variability (standard deviation) was reduced. The 2002 Farm Program reduced a significant portion of farm related risk. CRC sustains greater benefits when used individually.

CHAPTER 3 - Data and Methodology

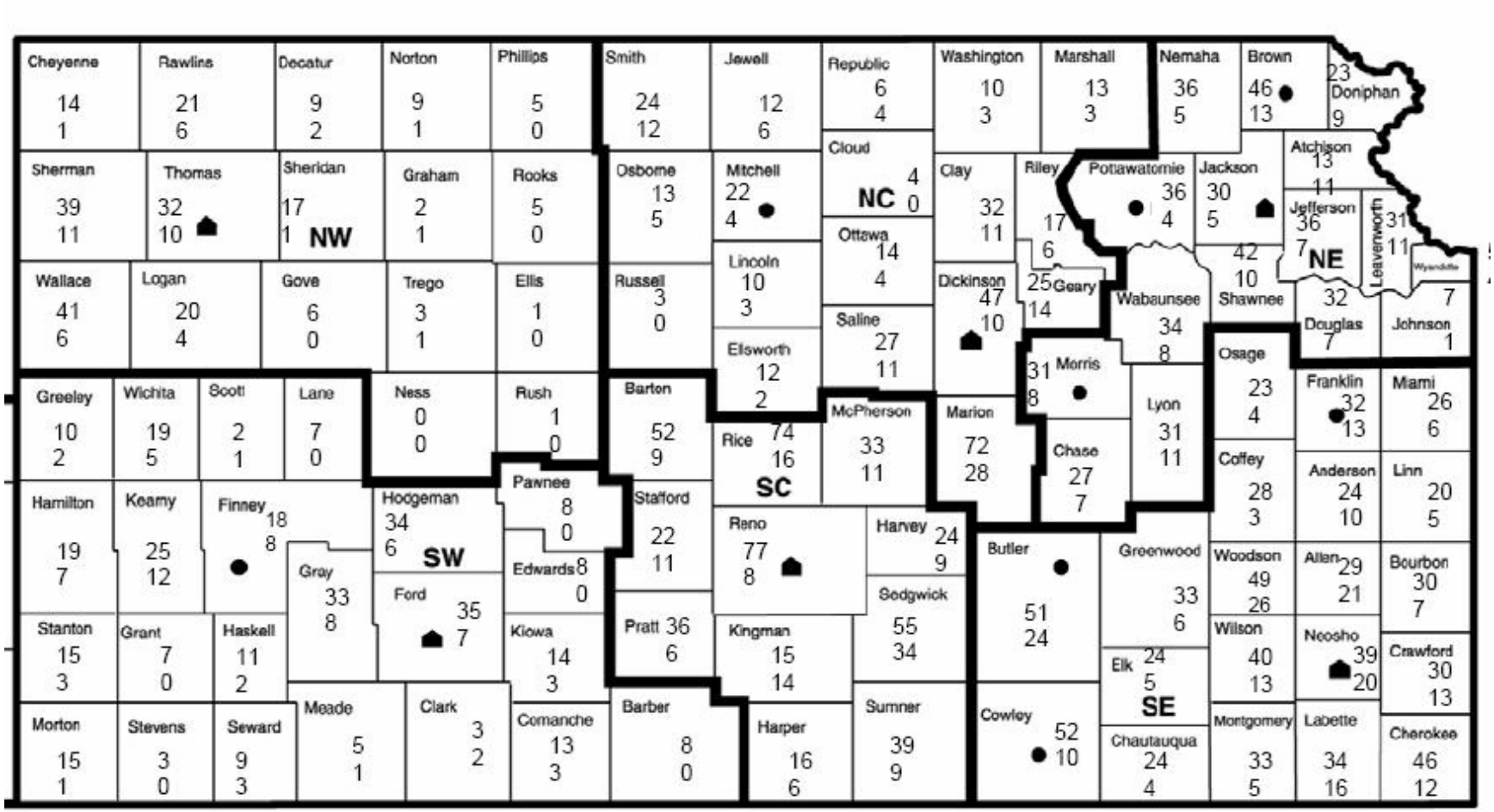
3.1 Overview

A panel data set was compiled to evaluate the impact of Adjusted Gross Revenue-Lite (AGR-Lite) on adjusted gross revenue to count (AGRC) and net farm income (NFI) variability for 219 Southeast (SE) Kansas farms. Beginning in 1993, continuous farm level data for 219 farms was assembled through the 2005 production year. This data was obtained from the Kansas Farm Management Association (KFMA) data set (Langemeier, 2003). The following section (3.2) describes the study area and provides some descriptive summary statistics about the data. Section 3.3 provides an overview of the AGR-Lite product. Furthermore this section discusses the sources of income and expenses used to derive AGR-Lite. Section 3.4 provides the mathematical derivation of AGR-Lite corresponding to contract guidelines and procedures. Subsequently section 3.5 outlines the methods of analysis used to evaluate AGR-Lite. To conclude, section 3.6 discusses the limitations faced and reveals the necessary assumptions to proceed with analysis of AGR-Lite.

3.2 Study Area

Kansas is divided into 6 Kansas Farm Management Association districts (Northeast, Southeast, North central, South central, Northwest, and Southwest) (Figure 3.1). Southeast Kansas was selected as the region to use for analysis as it has the greatest diversification within farms. Southeast Kansas is comprised of 20 counties.

Figure 3.1 Map of study area



The number of farms within these counties range from 4 to 20 (Appendix C). In total 219 farms remained in the data set after farms with incomplete data were dropped. Data was screened to eliminate farms with negative values for Allowable Farm Income (AFI), Allowable Expenses (AE), Prepaid Expenses (PE), and Accounts Receivable (AR). Additionally, farms exceeding maximum liability per coverage level and payment rate were eliminated. Farms with negative category income were also eliminated. Farms were categorized into five groups; all farms, crop farms, livestock farms, beef farms, and dairy farms. Farm category placement was determined by computing the proportion of income from each category (crop, livestock, beef, and dairy) relative to total income for each year from 1993 to 2005. If the average over the 13-year period was 50% or greater for either crop, livestock, beef, or dairy they were placed in the respective category. This criterion identified 126 crop farms and 93 livestock farms which include beef, dairy, swine, poultry, sheep, or any other animal. There were 64 beef farms and 13 dairy farms totaling 77. It is evident that the sum of beef and dairy farms is less than 93. This discrepancy results from 16 farms failing to achieve the 50% income threshold from beef or dairy alone. However, the combined income from all potential livestock income resulted in greater than 50% of their aggregate income. Therefore they were placed in the livestock category.

Figure 3.2 illustrates the trend in income for the 219 farms from 1993 through 2005. The chart illustrates the average income generated from crop, livestock, beef, and dairy sources for all farms from 1993 through 2005. Figure 3.3 illustrates the trend in AFI, NFI, Value of Farm Production (VFP) from 1993 to 2005. AGRC is illustrated beginning in 1999. During the period of analysis, 1999 to 2005 AFI, NFI, VFP, and

AGRC trended upward with the exception of 2002 (Figure 3.3). Over the 13-year period the average acres, irrigated and dry combined, ranged from 792 to 946, with a consistent acre increase from year to year. Average irrigated acres over the 1993 to 2005 horizon were minimal ranging from 6 to 13. Table 3.1 presents the summary statistics (farm numbers, total acres, AFI, NFI, AE, AGRC, VFP, Crop Income (CI), Livestock Income (LI), Beef Income (BI), Dairy Income (DI), and Total Income (TI)) by category over the 1993 to 2005 period.

Figure 3.2 Summary of income by category for 219 SE Kansas farms from 1993 through 2005

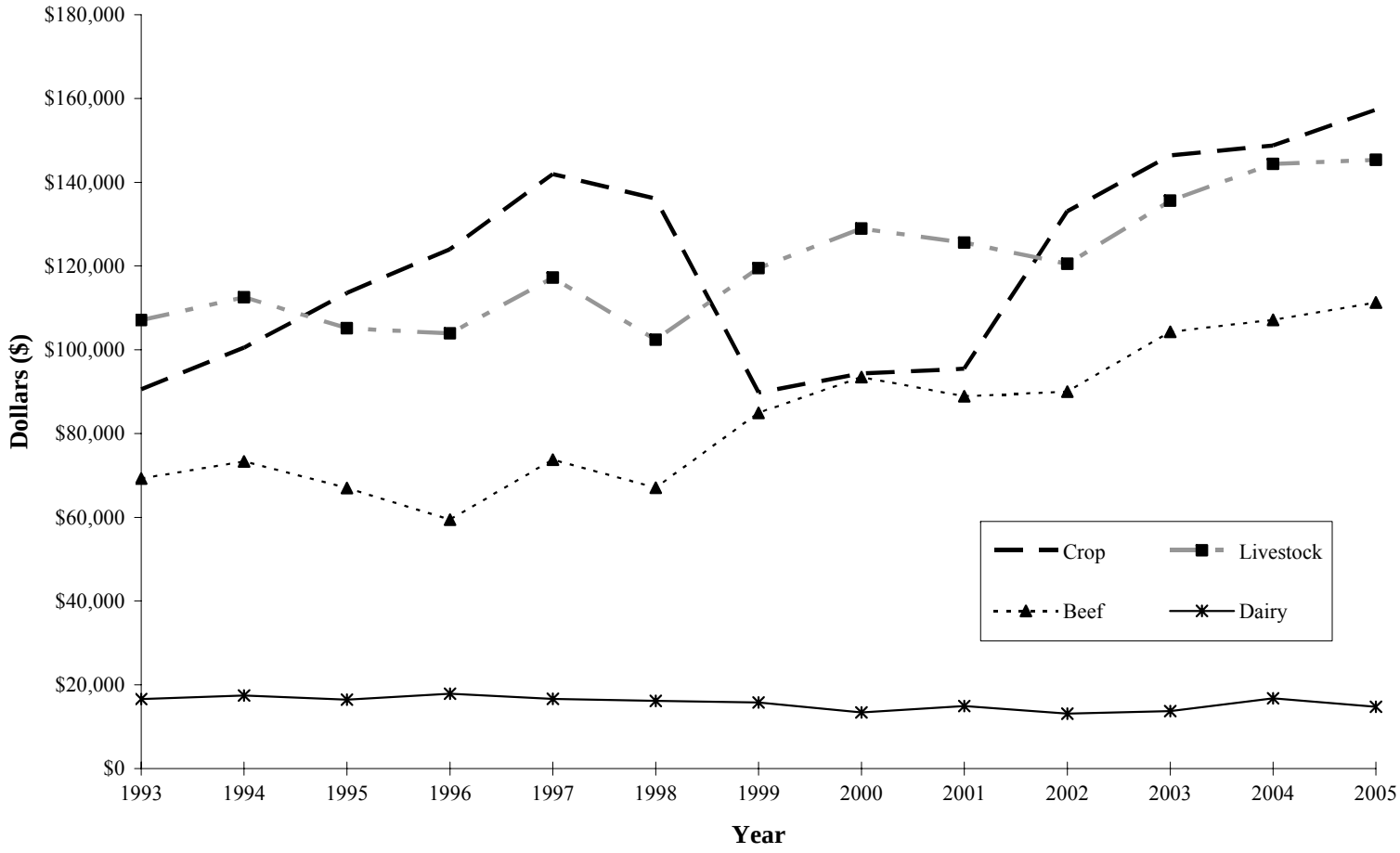


Figure 3.3 Summary of AFI, NFI, VFP, and AGRC for 219 SE Kansas Farms from 1993 through 2005

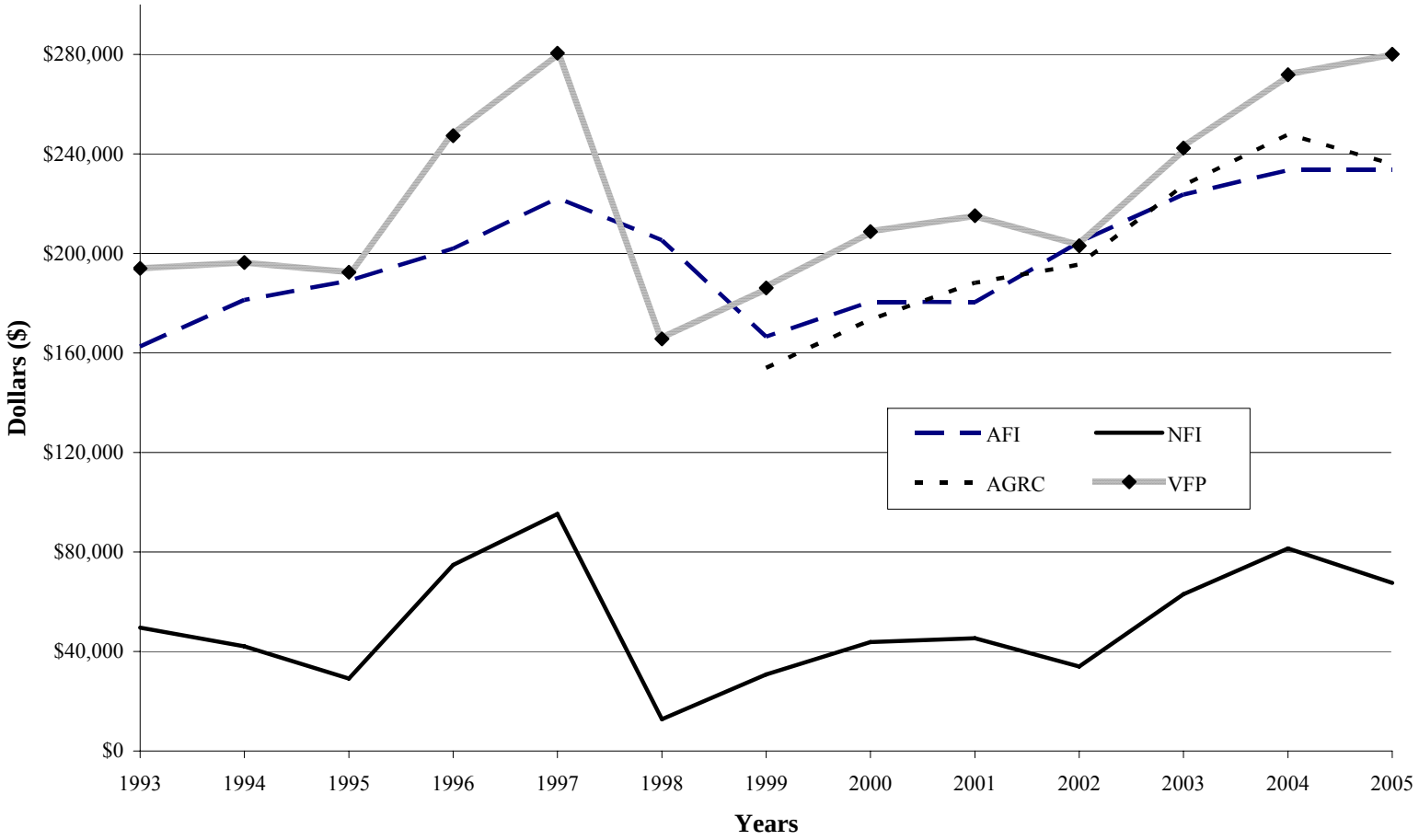


Table 3.1 Summary Statistics by farm category

	Total	Crop	Livestock	Beef	Dairy
Number of Farms	219	126	93	64	13
Total Acres[1]	866	1089	564	554	696
AFI[2]	$192,515	$183,613	$204,576	$173,221	$325,290
NFI[3]	$49,157	$50,044	$47,955	$40,602	$79,009
AE[4]	$171,322	$138,275	$216,097	$225,846	$242,741
AGRC[5]	$203,236	$192,445	$217,856	$185,560	$337,798
VFP[6]	$216,916	$222,867	$208,854	$181,297	$320,810
CI[7]	$120,771	$169,312	$55,007	$54,059	$66,658
LI[8]	$113,542	$32,571	$223,243	$226,508	$256,638
BI[9]	$82,563	$27,912	$156,607	$220,679	$8,489
DI[10]	$15,816	$890	$36,039	$2,016	$247,886
TI[11]	$234,313	$201,883	$278,250	$280,567	$323,296

[1]Total acres indicates the average acres (dry and irrigated) for each farm category over the 1993 to 2005 period

[2]Allowable Farm Income (AFI) reflects average AFI by farm category over the 1993 to 2005 period calculated using Equation 1 in the mathematical explanation.

[3]Net Farm Income (NFI) reflects the average NFI for each farm category over the 1993 to 2005 period calculated using Equation 22 in the mathematical explanation

[4]Allowable Expenses (AE) reflects the average AE for each farm category over the 1993 to 2005 period calculated using Equation 7 in the mathematical explanation

[5]Adjusted Gross Revenue to Count (AGRC) reflects the average AGRC for each farm category over the 1993 to 2005 period

[6]Value of Farm Production (VFP) reflects the average VFP for each farm category over the 1993 to 2005 period

[7]Crop Income (CI) reflects the average CI for each farm category over the 1993 to 2005 period

[8]Livestock Income (LI) reflects the average LI for each farm category over the 1993 to 2005 period

[9]Beef Income (BI) reflects the average BI for each farm category over the 1993 to 2005 period

[10]Dairy Income (DI) reflects the average DI for each farm category over the 1993 to 2005 period

[11]Total Income (TI) reflects the average TI for each farm category over the 1993 to 2005 period

3.3 AGR-Lite Components

3.3.1 AGR-Lite Overview

AGR-Lite became the first insurance product guaranteeing adjusted gross revenue for the whole-farm. Unlike existing insurance policies which establish individual commodities as the insurance unit, AGR-Lite identifies the whole-farm as the insurance unit. Consistent with existing FCIC insurance products, AGR-Lite continues protection against losses sustained from market fluctuations, fire, wind, hail, and other unavoidable perils. In providing a whole-farm guarantee, AGR-Lite expands the scope of crop insurance to include small diversified and/or specialized farms. AGR-Lite became the first Federal Crop Insurance Corporation (FCIC) program to provide coverage for crops, animals, and other uninsurable commodities under one insurance product by establishing revenue as a common denominator. AGR-Lite has been labeled "non traditional" in the sense that producers historical schedule F tax records are used in the process of determining the revenue guarantee. The amount of protection allotted is computed by multiplying the approved AGR by the selected coverage level and payment rate. Farm managers can select from a range of coverage levels and payment rates, which are consistent with existing insurance contracts. The approved AGR will be based on the lesser of the five-year average or indexed AGR (whichever is applicable) or the expected income for the current insurance year. AGR-Lite was drafted to incorporate procedures, indexing and factoring, to account for expansion or contraction in farm size. Indexing occurs for income and expenses and indicates farm expansion. Factoring only occurs to expenses and may indicate expansion (to a lesser extent than indexing) or contraction. Additional features of AGR-Lite included government subsidization of premiums,

consistent with existing FCIC insurance products. The extent of subsidization will vary with coverage level selection. AGR-Lite also extends producers the option to enroll/purchase additional insurance products which lower total liability that result in a reduction to producer paid premium. With the ability of farm managers to shift income from year to year, accrual adjustments are used during the claim submission process to ensure income is assigned to the year in which it was generated. Following the necessary adjustments producers will receive an indemnity when AGRC for the insurance year falls below the guaranteed level.

3.3.2 AGR-Lite Critical Values

The income measure used for AGR-Lite is linked to IRS 1040 Schedule F or equivalent tax forms. Values for AGR-Lite are drawn directly from those items reported on the following 2006 Schedule F form 1040. A discussion of the variables included in the calculation of AFI, defined by the contract, follows in the next section of the paper. Subsequently the paper identifies the variables used in computing AE and other critical parts of the insurance plan.

SCHEDULE F (Form 1040)

Department of the Treasury Internal Revenue Service (99)

Profit or Loss From Farming

▶ Attach to Form 1040, Form 1040NR, Form 1041, Form 1065, or Form 1065-B.

▶ See Instructions for Schedule F (Form 1040).

OMB No. 1545-0074

2006

Attachment Sequence No. 14

Name of proprietor | Social security number (SSN)

A Principal product. Describe in one or two words your principal crop or activity for the current tax year. | B Enter code from Part IV ▶

C Accounting method: (1) ☐ Cash (2) ☐ Accrual | D Employer ID number (EIN), if any

E Did you "materially participate" in the operation of this business during 2006? If "No," see page F-2 for limit on passive losses. ☐ Yes ☐ No

Part I **Farm Income—Cash Method.** Complete Parts I and II (Accrual method. Complete Parts II and III, and Part I, line 11.) Do not include sales of livestock held for draft, breeding, sport, or dairy purposes. Report these sales on Form 4797.

1	Sales of livestock and other items you bought for resale	1			
2	Cost or other basis of livestock and other items reported on line 1	2			
3	Subtract line 2 from line 1			3	
4	Sales of livestock, produce, grains, and other products you raised			4	
5a	Cooperative distributions (Form(s) 1099-PATR)	5a		5b Taxable amount	5b
6a	Agricultural program payments (see page F-3)	6a		6b Taxable amount	6b
7	Commodity Credit Corporation (CCC) loans (see page F-3):				
a	CCC loans reported under election			7a	
b	CCC loans forfeited	7b		7c Taxable amount	7c
8	Crop insurance proceeds and federal crop disaster payments (see page F-3):				
a	Amount received in 2006	8a		8b Taxable amount	8b
c	If election to defer to 2007 is attached, check here ▶ ☐			8d Amount deferred from 2005	8d
9	Custom hire (machine work) income			9	
10	Other income, including federal and state gasoline or fuel tax credit or refund (see page F-3)			10	
11	**Gross income.** Add amounts in the right column for lines 3 through 10. If you use the accrual method, enter the amount from Part III, line 51 ▶			11	

Part II **Farm Expenses—Cash and Accrual Method.** Do not include personal or living expenses such as taxes, insurance, or repairs on your home.

12	Car and truck expenses (see page F-4). Also attach Form 4562	12		25	Pension and profit-sharing plans	25	
13	Chemicals	13		26	Rent or lease (see page F-5):		
14	Conservation expenses (see page F-4)	14		a	Vehicles, machinery, and equipment	26a	
15	Custom hire (machine work)	15		b	Other (land, animals, etc.)	26b	
16	Depreciation and section 179 expense deduction not claimed elsewhere (see page F-4)	16		27	Repairs and maintenance	27	
				28	Seeds and plants	28	
				29	Storage and warehousing	29	
17	Employee benefit programs other than on line 25	17		30	Supplies	30	
				31	Taxes	31	
18	Feed	18		32	Utilities	32	
19	Fertilizers and lime	19		33	Veterinary, breeding, and medicine	33	
20	Freight and trucking	20		34	Other expenses (specify):		
21	Gasoline, fuel, and oil	21		a		34a	
22	Insurance (other than health)	22		b		34b	
23	Interest:			c		34c	
a	Mortgage (paid to banks, etc.)	23a		d		34d	
b	Other	23b		e		34e	
24	Labor hired (less employment credits)	24		f		34f	

35	**Total expenses.** Add lines 12 through 34f. If line 34f is negative, see instructions ▶	35	
36	**Net farm profit or (loss).** Subtract line 35 from line 11. • If a profit, enter the profit on **Form 1040, line 18,** and also on **Schedule SE, line 1.** If you file Form 1040NR, enter the profit on **Form 1040NR, line 19.** • If a loss, you **must** go to line 37. Estates, trusts, and partnerships, see page F-6.	36	
37	If you have a loss, you **must** check the box that describes your investment in this activity (see page F-6). • If you checked 37a, enter the loss on **Form 1040, line 18,** and **also** on **Schedule SE, line 1.** If you file Form 1040NR, enter the loss on **Form 1040NR, line 19.** • If you checked 37b, you **must** attach **Form 6198.** Your loss may be limited.	37a ☐ All investment is at risk. 37b ☐ Some investment is not at risk.	

Part III **Farm Income—Accrual Method** (see page F-7).

Do not include sales of livestock held for draft, breeding, sport, or dairy purposes. Report these sales on Form 4797 and do not include this livestock on line 46 below.

38	Sales of livestock, produce, grains, and other products				38	
39a	Cooperative distributions (Form(s) 1099-PATR)	39a		39b Taxable amount	39b	
40a	Agricultural program payments	40a		40b Taxable amount	40b	
41	Commodity Credit Corporation (CCC) loans:					
a	CCC loans reported under election				41a	
b	CCC loans forfeited	41b		41c Taxable amount	41c	
42	Crop insurance proceeds				42	
43	Custom hire (machine work) income				43	
44	Other income, including federal and state gasoline or fuel tax credit or refund				44	
45	Add amounts in the right column for lines 38 through 44				45	
46	Inventory of livestock, produce, grains, and other products at beginning of the year	46				
47	Cost of livestock, produce, grains, and other products purchased during the year	47				
48	Add lines 46 and 47	48				
49	Inventory of livestock, produce, grains, and other products at end of year	49				
50	Cost of livestock, produce, grains, and other products sold. Subtract line 49 from line 48*				50	
51	**Gross income.** Subtract line 50 from line 45. Enter the result here and on Part I, line 11 ▶				51	

*If you use the unit-livestock-price method or the farm-price method of valuing inventory and the amount on line 49 is larger than the amount on line 48, subtract line 48 from line 49. Enter the result on line 50. Add lines 45 and 50. Enter the total on line 51 and on Part I, line 11.

Part IV **Principal Agricultural Activity Codes**

CAUTION *File Schedule C (Form 1040) or Schedule C-EZ (Form 1040) instead of Schedule F if* ***(a)*** *your principal source of income is from providing agricultural services such as soil preparation, veterinary, farm labor, horticultural, or management for a fee or on a contract basis, or* ***(b)*** *you are engaged in the business of breeding, raising, and caring for dogs, cats, or other pet animals.*

These codes for the Principal Agricultural Activity classify farms by their primary activity to facilitate the administration of the Internal Revenue Code. These six-digit codes are based on the North American Industry Classification System (NAICS).

Select the code that best identifies your primary farming activity and enter the six digit number on page 1, line B.

Crop Production

111100 Oilseed and grain farming
111210 Vegetable and melon farming
111300 Fruit and tree nut farming
111400 Greenhouse, nursery, and floriculture production
111900 Other crop farming

Animal Production

112111 Beef cattle ranching and farming
112112 Cattle feedlots
112120 Dairy cattle and milk production
112210 Hog and pig farming
112300 Poultry and egg production
112400 Sheep and goat farming
112510 Animal aquaculture
112900 Other animal production

Forestry and Logging

113000 Forestry and logging (including forest nurseries and timber tracts)

Allowable Farm Income

AFI, by definition, includes any income generated from the production of insurable commodities less any added value due to post production activities, which the contract refers to as incidental to the business of farming. Added value created during the stage of production, as a result of post production activities, increases the value of the commodity, is not covered under AGR-Lite. Incidental post production activities constitute activities which are normally performed to prepare a commodity for its normal condition for market. Such activities may include but are not limited to sorting, washing, packing, grading, that does not alter the physical nature of the commodity which producers are required to report to the IRS. Activities such as canning or freezing alter the physical state of the agricultural commodity, which increases the value of the commodity, are considered not incidental to the business of farming. This added value created through non-incidental activities will not be covered under the AGR-Lite policy. For example, a grape grower who produces wine from grapes would not report income obtained through wine sales. Income received from the sale of wine, resulting from a value added process, does not constitute AFI and thereby not covered by AGR-Lite. Whereas income generated from the marketing of grapes would be considered AFI. Producers will only report income defined by the contract corresponding to the items below taken from IRS Schedule F Form 1040. It is important to note the discussion of allowable items below correspond to individuals filing on a cash basis. Alternatively, if filing using the accrual method, appropriate items can be found on page two of Schedule F form 1040. If inclusion of income other than that defined as AFI is found on the AFI worksheet, Figure D.1 in Appendix D, prior to the insurance year, the corresponding

amounts will be deducted for AGR-Lite calculations. If such income is found following the closing date, the individual's contract will be terminated effective the date of notice.

Eligible Income Items

The calculation of AFI includes items 3, 4, 5b, 7a, 7c, and 10 from Schedule F form 1040. Line 3 of Schedule F reports the sales of animals and agricultural commodities purchased for resale obtained from subtracting Line 2 (cost basis of animals and agricultural commodities purchased for resale) from Line 1 (sales of all animals and agricultural commodities purchased for resale). Income generated from the sale of agricultural commodities including animals, produce, and grains, located on Line 4, will be included in calculating AFI. Line 5b of schedule F reports all cooperative distributions directly related to the sales of agricultural commodities. Any income reported as such is considered AFI. Commodity Credit Corporation (CCC) loans (Line 7a of Schedule F) which were received from production placed under loan that the insured elected to report are considered AFI and will be included. Furthermore individuals will include the taxable amount of forfeited CCC loans, Line 7c of Schedule F in the AFI calculation. Finally, other income, Line 10 of Schedule F, is considered AFI. Income qualifying as other income may include income generated from bartering, bypassed acreage payments received by the insured in accordance with a contract specifying payment to the insured for forgoing harvest of the commodity, payments received to forgo the production or harvest of an agricultural commodity through diversions, and set-asides.

Ineligible Income Items

Ineligible income, which is thereby excluded from AFI calculations, includes federal or state fuel tax credits and refunds, cooperative dividends, custom hire (machine work), agricultural program payments (Loan Deficiency Program (LDP) payments, Direct Payments, Counter-Cyclical Program payments, Conservation Reserve Program (CRP) payments, Conservation Reserve Enhancement Program (CREP) payments, Farm Service Agency (FSA) loans, Noninsured Crop Disaster Assistance Program (NAP) payments, ad hoc disaster assistance, Marketing Loss Assistance (MLA) payments). Figure D.4 in Appendix D reveals which payments to include in AFI calculations. However, it is important to note this is not an exhaustive list. Other sources considered ineligible income include crop insurance payments, net gain from commodity hedges, animals for sport and show, timber, forest, and forest products.

Allowable Expenses

In addition to maintaining thorough income records, farm managers must also maintain accurate expense documentation. Although AGR-Lite guarantees gross income, expenses are referenced in downsizing farm scenarios and monitored to prevent moral hazard. Moral hazard occurs when the presence of insurance alters the expected loss of a given event. These records will be referenced as part of claim submission procedures to analyze the insured's expense activity within a production year. If expense activity appears inconsistent or abnormal there will be resulting implications to the guarantee level. A discussion of those items considered AE follows. Again, refer to the 2006 Schedule F form 1040 above to locate the AE items. Additionally Figure D.2 in Appendix D presents a form to assist in documenting the necessary items to include in

AE calculations. AE by definition includes expenses directly associated with the production and gross income from insurable commodities. Conversely, indirect expenses include expenses which do not directly influence production or gross income. Those expenses considered indirect to the farming operation, do not constitute AE and as such are excluded from the total. Examples of these items, considered indirect, include employee benefits, interest expense, pension and profit-sharing, rent or leasing, and taxes. Furthermore, post production expenses are not considered AE and must be excluded. Costs associated with post production activities may include costs incurred as a result of processing, packaging, packing or any other post production activity. The following items from IRS Form 1040 Schedule F will be used in deriving AE:

Line 2 - Cost basis or other basis of animals and other agricultural commodities that were bought for resale and sold during the tax year
Line 12 – Car and truck expenses
Line 13 – Chemical expenses
Line 14 – Conservation expenses
Line 15 – Custom hire (Machine Work)
Line 16 – Depreciation and section 179 expense deduction (include only the amount of depreciation allowed for animals)
Line 18 – Feed purchased
Line 19 – Fertilizer and lime expenses
Line 20 – Freight and trucking expense
Line 21 – Gasoline, fuel, and oil expense
Line 22 – Insurance (other than health)
Line 24 – Labor hired (less employment credits) (exclude share holder wages)
Line 27 – Repairs and maintenance
Line 28 – Seeds and plants purchased
Line 29 – Storage and warehousing

Line 30 – Supplies purchased (Exclude those used in post-production value added operations such as processing, packing, packaging, ect.)

Line 32 – Utilities

Line 33 – Veterinary, breeding, and medicine

Line 34 – Other farm expenses (include only those expenses directly related to the production of agricultural commodities that the IRS allows the insured to report.)

3.4 AGR-Lite Mathematical Derivation

The following equations outline the mathematical derivation of the AGR-Lite contract. These equations have been constructed to conform to AGR-Lite handbook guidelines and procedures (USDA, 2007). Subsequently, these equations were used to estimate AGRC and NFI distributions with and without participation in the AGR-Lite program as a stand alone product. Figure 3.4 provides a flow chart to assist in visually understanding the AGR-Lite process. Decision areas are marked with question marks and "yes" or "no" responses. The flow chart closely parallels the following equations in a more simplified format.

(1) $\mathbf{AFI_{kj}} = \sum$ Schedule F (3, 4, 5b, 7a, 7b, 10)

AFI_{kj} Allowable Farm Income for insurance year k = 0 for farm j

*Refer to the 2006 Schedule F form above for item description

*Farm income from the production of insurable agricultural commodities minus added value for any agricultural commodity due to post-production operations such as processing, packing, packaging, etc. that the IRS requires producers to report.

k Years; for k = -6,-5,-4,-3,-2

*Individuals must produce 5 consecutive years of IRS 1040 Schedule F filings or equivalent tax forms beginning prior to the year immediately preceding the

insurance year. (For 2007 insurance year, submit Schedule F filings for 2005, 2004, 2003, 2002, and 2001)

(2) $\mathbf{AGRA_{kj}} = \sum_{k=-6}^{-2}(AFI_{kj})/5$

$AGRA_{kj}$ Adjusted Gross Revenue 5-Year Average for insurance year k = 0 for farm j

(3) $\mathbf{IITF_{kj}} = MAX\{((\sum_{k=-6}^{-3} MAX\{MIN\{(AFI_{k+1\,j}/AFI_{kj}),1.200\},0.800\})/4)^4,1.000\}$

$IITF_{kj}$ Income Indexing Trend Factor for insurance year k = 0 for farm j

*The annual indexing is capped (1.200) and cupped (0.800). Refer to the example below for indexing AGR. The resulting income indexing trend factor is cupped (1.000). Values below 1.000 will not result in indexing and as such the guarantee will be based on the lesser of AGRA and EI.

(4) $\mathbf{IAGR_{kj}} = IF(AND(MAX\{AFI_{k-2\,j}, AFI_{k-3\,j}\}, EI_{kj}) > AGRA_{kj}, IITF_{kj} \times AGRA_{kj}, AGRA_{kj})$

$IAGR_{kj}$ Indexed Adjusted Gross Revenue for insurance year k = 0 for farm j

*If one of the two most recent tax year's allowable income in the 5-year base period and the expected income for the current insurance year (Item 8, Intended Agricultural Commodity Report) in the Annual Farm Report exceeds the 5-year average the individual qualifies for indexing.

EI_{kj} Expected Income for year insurance k = 0 for farm j at time of application.

*Expected Income reflects the expected income from commodities to be produced (Item 8 of the Intended Agricultural Commodity Report) in the Annual Farm Report, filed prior to each insurance year as part of the application process.

Year	Income	Income Indexing Calculations	
2000	$130,000		
2001	$165,000	1.269	$165,000/$130,000 = 1.269 (capped 1.200)
2002	$150,000	0.909	$150,000/$165,000 = 0.909
2003	$163,500	1.090	$163,500/$150,000 = 1.090
2004	$168,000	1.028	$168,000/$163,500 = 1.028
5-year average	$155,300	1.057	(1.200+0.909+1.090+1.028)/4
Income Trend Factor		1.248	(1.057*1.057*1.057*1.057) = 1.248
Indexed Income	$193,852		($155,300*1.248) = $193,852

(5) $\mathbf{AAGR_{kj}} = \text{MIN}(IAGR_{kj}, EI_{kj})$

$AAGR_{kj}$ Approved Adjusted Gross Revenue for insurance year k = 0 for farm j

(6) $\mathbf{AGRL_{kj}} = (AAGR_{kj} \times CL_{kj} \times PR_{kj}) \leq ML_{kj}$

$AGRL_{kj}$ Adjusted Gross Revenue Liability for insurance year k = 0 for farm j

CL_{kj} Coverage Level (65%, 75%, 80% of adjusted gross revenue) selected by farmer for insurance year k = 0 for farm j

PR_{kj} Payment Rate (75% and 90% for each coverage level) selected for insurance year k = 0 for farm j

65/75, 65/90, 75/75, 75/90	Everyone Qualifies (One crop requirement)
80/75, 80/90	Three crop requirement[1]

[1]To qualify for 80% coverage levels the individual must indicate on the Intended Agricultural Commodity report that at least three commodities will be produced whose income will result in a value greater than or equal to that determined by the diversification formula.

ML_{kj} Maximum Liability for insurance year k = 0 for farm j

Coverage Level	Payment Rate	Maximum Gross Revenue*
65%	75%	$2,051,282
65%	90%	$1,709,401
75%	75%	$1,777,777
75%	90%	$1,481,481
80%	75%	$1,666,666
80%	90%	$1,388,888

*Represents the maximum approved revenue for each coverage level and payment rate an individual may generate to be eligible for AGR-Lite due to the $1,000,000 maximum liability guarantee offered by the contract.

(7) $\mathbf{AE_{kj}} = \sum$Schedule F (12, 13,14,15,16, 18, 19, 20, 21, 22, 24, 27, 28, 29, 30, 32, 33, 34)

AE_{kj} Allowable Expenses (Schedule F)* for insurance year k = 0 for farm j

*Only expenses directly associated with the production of insurable agricultural commodities are allowable, indirect expenses must be excluded.

*If individual qualified for indexing and the income trend factor was greater than one then expenses must be indexed accordingly as prescribed by the contract.

*Refer to the attached Schedule F above for item description

(8) $\mathbf{AEA_{kj}} = \sum_{k=-6}^{-2} (AE_{kj}) / 5$

AEA_{kj} Allowable Expenses 5-Year Average for insurance year k = 0 for farm j

(9) $\mathbf{EITF_{kj}} = MAX\{((\sum_{k=-6}^{-3} MAX\{MIN\{(AE_{k+1j} / AE_{kj}),1.200\}0.800\}) / 4)^4,1.000\}$

$EITF_{kj}$ Expense Indexing Trend Factor for insurance year k = 0 for farm j

*The annual indexing is capped (1.200) and cupped (0.800). The resulting expense indexing trend factor is cupped (1.000). Values below 1.000 will not result in indexing and as such the guarantee will be based on AEA. Refer to the example below for indexing AEA.

(10) $\mathbf{IAE_{kj}} = IF(AND(MAX\{AFI_{k-2}, AFI_{k-3}\}, EI_{kj}) > AGRA_{kj}, EITF_{kj} \times AEA_{kj}, AEA_{kj})$

IAE_{kj} Indexed Allowable Expenses for insurance year k = 0 for farm j

*If an individual performed income indexing, similar procedures must be implemented to 5-year average expenses (AEA). IAE will be used conditional on the following provisions 1) income indexing was conducted and 2) conditions triggering "Factor Up" did not exist. Refer to the example below for indexing and equation 11 which illustrates factoring up and down.

Year	Expense	Expense Indexing Calculations	
2000	$63,500		
2001	$69,550	1.095	$69,550/$63,500 = 1.095
2002	$55,000	0.791	$55,000/$69,550 = 0.791(cupped 0.800)
2003	$72,000	1.309	$72,000/$55,000 = 1.309 (capped 1.200)
2004	$77,000	1.069	$72,000/$77,000 = 1.069
5-year average	$67,410	1.041	(1.095+0.800+1.200+1.069)/4
Expense Trend Factor		1.174	(1.041*1.041*1.041*1.041) = 1.174
Indexed Expenses	$79,164		($67,410*1.174) = $79,164

(11) $\mathbf{FAE_{kj}} = IF(IAGR_{kj} > AAGR_{kj} > AGRA_{kj}), AEA_{kj} \times (AAGR_{kj} / AGRA_{kj}), IAE_{kj})$

Factor Up Example

Year	Income	Index		Expenses
1	$140,000			$92,000
2	$165,000	1.179	($165,000/$140,000) = 1.179	$100,000
3	$150,000	0.909	($150,000/$165,000) = 0.909	$94,000
4	$163,500	1.090	($163,500/$150,000) = 1.090	$99,900
5	$168,000	1.028	($168,000/$163,500) = 1.028	$102,000
Index Trend Factor		1.222	((1.179 + 0.909 + 1.090 +1.028)/4)^4	
5-Year Average	$157,300			$97,580
Intended Income	$180,000			
Indexed AGR	$192,145			
Approved AGR	$180,000			
Factor Ratio	1.144	($180,000/$157,300) = 1.144		
Approved Expenses	$111,662	($97,580 x 1.144) = $111,662		

*If the individual qualified for income indexing and the Indexed AGR (IAGR) > Approved AGR (AAGR) > 5-Year Average AGR (AGRA) the individual must "Factor Up" multiplying 5-Year average expenses(AEA) by the ratio (approved AGR (AAGR) / 5-Year average AGR (AGRA)) arriving at approved allowable expenses (AAE).

$\mathbf{FAE_{kj}} = IF(AAGR_{kj} < AGRA_{kj}, AEA_{kj} \times (AAGR_{kj} / AGRA_{kj}), AEA_{kj})$

Factor Down Example

Year	Income	Expenses
1	$102,000	$99,000
2	$101,000	$94,000
3	$100,000	$95,000
4	$99,000	$85,000
5	$98,000	$82,500
5-Year Average	$100,000	$91,100
Intended Income	$85,000	
Approved AGR	$85,000	
Factor Ratio	0.850	($85,000/$100,000) = 0.850
Approved Expenses	$77,435	$91,100*0.850 = $77,435

*If the approved AGR (AAGR) < 5-year average AGR (AGRA) the individual must "Factor Down" multiplying the 5-year average expenses (AEA) by the ratio (AAGR/AGRA) arriving at approved allowable expenses (AAE)

FAE_{kj} Factored Allowable Expenses for insurance year k = 0 for farm j

*AEA will be factored up or down conditional on the following provisions. When Indexed AGR (IAGR) > Approved AGR (AAGR) > 5-year average AGR (AGRA), AEA is "Factored Up" taking the product of AEA and the ratio of Approved AGR (AAGR) to 5-year Average AGR (AGRA). When Approved AGR (AAGR) < 5-year Average AGR (AGRA), AEA is "Factored Down" by taking the product of AEA and the ratio of Approved AGR (AAGR) to 5-year Average AGR (AGRA)

(12) $\mathbf{AAE_{kj}} = FAE_{kj}$

AAE_{kj} Approved Allowable Expenses for insurance year k = 0 for farm j

Indemnity Calculation

(13) $\mathbf{PEP_{kj}} = (AE_{kj} + \Delta AP_{kj} + \Delta PE_{kj})/ AAE_{kj}$

PEP_{kj} Production Expense Percentage for insurance year k = 0 for farm j

ΔAP_{kj} Change in Accounts Payable for insurance year k = 0 for farm j

*Accrual adjustments will occur in AE by the change (increase or decrease) in AP (ending – beginning accounts payable). To ensure accurate allocation of expenses AP are added back. When AP increases (goods and services received but not yet paid for) AE will increase by the net change. Thus the associated costs are included in current insurance year.

ΔPE_{kj} Change in Prepaid Expenses for insurance year k = 0 for farm j

*Accrual adjustments will occur in AE by the change (increase or decrease) in PE (beginning – ending prepaid expenses). To ensure the allocation of expenses to the applicable period PE are added back. When PE increases (goods and services paid for but not yet received) AE will decrease because goods and services are deferred until the following period.

(14) $\mathbf{ERP_{kj}} = MAX (70\% - PEP_{kj}, 0)$

ERP_{kj} Expense Reduction Percentage for insurance year k = 0 for farm j

*If Allowable Expenses (AE) for the insurance year are less than 70% of the Approved Allowable Expenses (AAE), the approved AGR (AAGR) will be

reduced 0.1% for each 0.1% the allowable expenses (AE) for the insurance year falls below 70% of the Approved Allowable Expenses (AAE).

(15) **ER_{kj} =** ERP_{kj} x $AAGR_{kj}$

ER_{kj} Expense Reduction for insurance year k = 0 for farm j

*If Allowable Expenses (AE) fall below 70% of Approved Allowable Expenses (AAE) (determined in equation 14), Approved AGR (AAGR) will be reduced (by ER), proportional to the reduction observed in AAE established for the current insurance year.

(16) **$ADJAAGR_{kj}$ =** $AAGR_{kj} - ER_{kj}$

ADJAAGRj Adjusted Approved AGR for insurance year k = 0 for farm j

*Approved AGR will be reduced by the value determined in equation 15, to reflect the proportional change in AAE. This result will then be used in establishing the guarantee level.

(17) **$AGRLIP_{kj}$ =** $ADJAAGR_{kj}$ x CL_{kj}

$AGRLIP_{kj}$ AGR Loss Inception Point for insurance year k = 0 for farm j

(18) **$AGRC_{kj}$ =** $AFI_{kj} + \Delta AR_{kj} + \Delta IN_{kj} + NAP_{kj} + NGCH_{kj} + GCIIP_{kj} + SPIK_{kj} + MO_{kj}$

$AGRC_{kj}$ Adjusted Gross Revenue to Count for insurance year k = 0 for farm j

AFI_{kj} Allowable Farm Income for insurance year k = 0 for farm j at time of filing

ΔAR_{kj} Change in Accounts Receivable for insurance year k = 0 for farm j

*The adjustment is plus or minus the difference between the dollar amount of the beginning and ending accounts receivable.

ΔIN_{kj} Change in crop and livestock Inventory for insurance year k = 0 for farm j

*The adjustment is plus or minus the change in value of the beginning and ending inventories for crops and livestock.

NAP_{kj} Noninsured Crop Disaster Assistance Program Payments for insurance year k = 0 for farm j

$NGCH_{kj}$ Net Gain from Commodity Hedges for insurance year k = 0 for farm j

$GCIIP_{kj}$ Gross Crop Insurance Indemnity Payments for insurance year k = 0 for farm j

*Include payments from APH, CRC, RA, GRP, GRIP, LRP, LGM, Private Hail, Mortality or any other product offered under the authority of the ACT including applicable premiums.

$SPIK_{kj}$ Sugarbeet – Payment in Kind for insurance year k = 0 for farm j

MO_{kj} Marketing Orders – cranberry, tart cherries for insurance year k = 0 for farm j

(19) $\mathbf{RD_{kj}} = \text{MAX}(\text{AGRLIP}_{kj} - \text{AGRC}_{kj}, 0)$

RD_{kj} Revenue Deficiency for insurance year k = 0 for farm j

(20) $\mathbf{ID_{kj}} = \text{RD}_{kj} \times \text{PR}_{kj}$

ID_{kj} Indemnity Payment for insurance year k = 0 for farm j

(21) The following equations illustrate the methods used to calculate premiums and rates used to analyze AGR-Lite as a stand-alone product. It is important to note these premium equations do not conform to those defined in the contract. Refer to Appendix B to view the original premium equation.

a. $\mathbf{AFPF_{yj}} = \sum_{y=1999}^{2005} ID_{yj} / 7$

$AFPF_{yj}$ Actuarially Fair Premium by Farm where y equals the years in which the farm enrolled in AGR-Lite for farm j

b. $\mathbf{AFAR_{yj}} = \sum_{y=1999}^{2005} \sum_{j=1}^{N} ID_{yj} \; / \; \sum_{y=1999}^{2005} \sum_{j=1}^{N} AGRL_{yj}$

$AFAR_{yj}$ Actuarially Fair Average Rate where y equals the years in which the farm enrolled in AGR-Lite and j equals 1 to N farms in the category

c. $\mathbf{AFARI_{yj}} = \sum_{y=1999}^{2005} \sum_{j=1}^{NI} ID_{yj} \; / \; \sum_{y=1999}^{2005} \sum_{j=1}^{NI} AGRL_{yj}$

$AFARI_{yj}$ Actuarially Fair Average Rate for farms with Indemnity where y equals the years in which the farm enrolled (1999-2005) in AGR-Lite, j equals the 1 to NI farms in the category.

Note: AFARI solely sums indemnities and liabilities from farms with claims. Therefore NI is the number of farms with at least one indemnity

(22) $\mathbf{NFI_{yj}} = (VFP_{yj} - COE_{yj} - DP_{yj} - AIE_{yj}) - (CIP_{yj} + CIPE_{yj} - CIPB_{yj}) + CIE_{yj}$

VFP_{yj} Value of Farm Production for years y = 1999 to 2005 for farm j

COE_{yj} Cash Operating Expenses for years y = 1999 to 2005 for farm j

DP_{yj} Depreciation for years y = 1999 to 2005 for farm j

AIE_{yj} Accrued Income-Expense adjustment for years y = 1999 to 2005 for farm j

CIP_{yj} Crop Insurance Proceeds for years y = 1999 to 2005 for farm j

$CIPE_{yj}$ Crop Insurance Proceeds Ending value for years y = 1999 to 2005 for farm j

$CIPB_{yj}$ Crop Insurance Proceeds Beginning Value for years y = 1999 to 2005 for farm j

CIE_{yj} Crop Insurance Expense (accrual) for years y = 1999 to 2005 for farm j

(23) $\mathbf{NFIAGR_{yj}} = NFI_{yj} + ID_{yj} - (AFPF_{yj} \text{ or } AFAR_{yj} \text{ or } AFARI_{yj})$

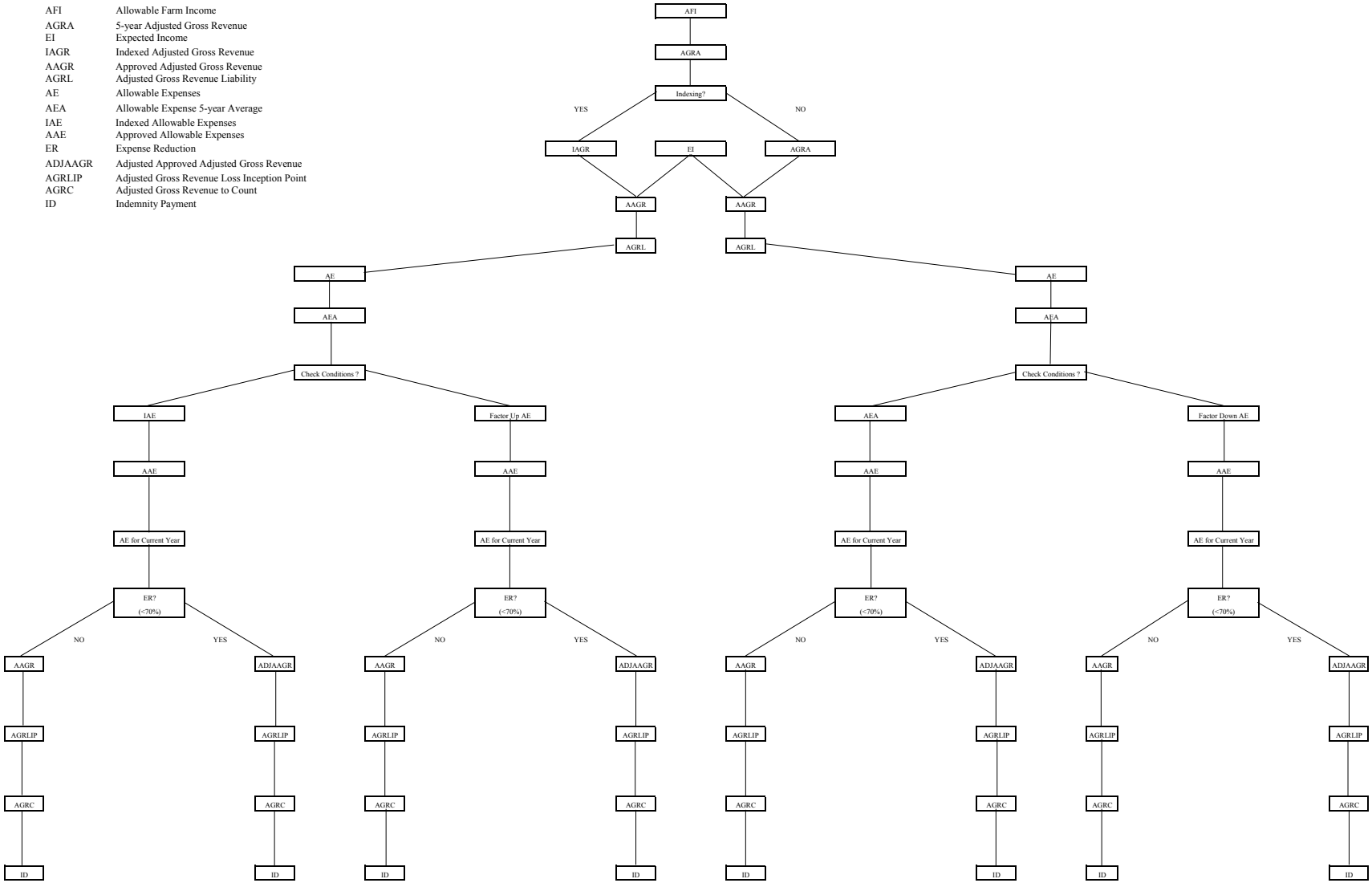
$NFIAGR_{yj}$ Net Farm Income from AGR-Lite for insurance year y = 1999 to 2005 for farm j

(24) $\mathbf{AGRCAGR_{yj}} = AGRC_{yj} + ID_{yj} - (AFPF_{yj}$ or $AFAR_{yj}$ or $AFARI_{yj})$

$AGRCAGR_{yj}$ Adjusted Gross Revenue to Count from AGR-Lite for insurance year y = 1999 to 2005 for farm j

Figure 3.4 Flow chart of the AGR-Lite program

AFI	Allowable Farm Income
AGRA	5-year Adjusted Gross Revenue
EI	Expected Income
IAGR	Indexed Adjusted Gross Revenue
AAGR	Approved Adjusted Gross Revenue
AGRL	Adjusted Gross Revenue Liability
AE	Allowable Expenses
AEA	Allowable Expense 5-year Average
IAE	Indexed Allowable Expenses
AAE	Approved Allowable Expenses
ER	Expense Reduction
ADJAAGR	Adjusted Approved Adjusted Gross Revenue
AGRLIP	Adjusted Gross Revenue Loss Inception Point
AGRC	Adjusted Gross Revenue to Count
ID	Indemnity Payment



3.5 Procedures and Methods of Analysis

3.5.1 Equation Explanations

Prior to enrollment in AGR-Lite individuals must prove that they are "qualifying person." The AGR-Lite policy considers one "qualifying person" as long as the individual effectively demonstrates the following.

> First the individual must be engaged in the business of farming and derive income from agricultural commodities within approved AGR-Lite counties, (2) must be a U.S. citizen, (3) must file schedule F or equivalent tax forms, (4) file a federal income tax form for each year of AGR income and expense history for the same tax entity unless the entity changes, stop farming, or a successor farming operation changes entity (RMA, 2007).

Assuming each individual complied with the provisions above, data were extracted from the KFMA data bank to generate critical values Allowable Farm Income (AFI), Allowable Expenses (AE), Change in Prepaid Expenses (ΔPE), Change in Accounts Receivable (ΔAR), Change in Inventories (ΔIN), and Net Farm Income (NFI). The procedures used are located in Appendix A. These values were computed for each farm for every year from 1993 to 2005. A spreadsheet was used to perform the essential calculations to generate distributions for indemnity payments, AFI, AGRC, and NFI with and without participation in the AGR-Lite program for production years 1999 through 2005. Two data sets were required to evaluate AGR-Lite. The first data set, including years 1993 to 2005, was required to create farm categories and compile the necessary information to generate 5-year Adjusted Gross Revenue Average (AGRA) and AE from Equations 2 and 8. A second data set, including years 1999 to 2005, was assembled to

include accrual adjustments (AR, IN, and PE) for product analysis and NFI to evaluate the impact of participation in AGR-Lite. The following sections provide a detailed description of formulas used to assist in understanding the AGR-Lite program.

Allowable Income

Once the critical values were placed in a spreadsheet a series of equations followed to compute whether an individual received a claim. Using AFI from each year beginning in 1993, AGRA from Equation 2 was derived for each year of insurance (1999-2005) using the base period. Base periods were established using five consecutive years of AFI from Equation 1 beginning the year prior to the year preceeding the insurance year. To illustrate, an individual insuring the 2007 production year derives AGRA from the base period beginning in 2005 proceeding back in time to 2001. Using the base period, AGRA was equated by totaling AFI from each year and dividing by five (Equation 2).

Indexing

For operations exhibiting farm expansion, indexing will occur to ensure effective coverage of the farm. Calculations are performed each insurance year to monitor the farm's growth to determine whether adjustments are necessary. Indexing occurs if the farm "qualifies." Using the example above, a farm will "qualify" if AFI from either of the two most recent years in the base period (2004 or 2005) and the Expected Income (EI) reported on the annual farm report, exceed AGRA (Equation 4). Farm managers submit annual farm reports each year to indicate commodities to be produced, anticipated production, and the expected resulting income from each commodity (Figure D.3 in Appendix D). If conditions warrant indexing, indicating the above circumstances were

satisfied, the following calculations are performed to reveal the extent with which the farm may adjust the guarantee. Referring to the example in Equation 3, indexing occurs by taking the AGR from 2002 and dividing by the AGR from 2001 and rounded to three decimals. Similarly, 2003 AGR is divided by 2002 AGR, then 2004 AGR is divided by 2003 AGR, and finally 2005 AGR divided by 2004 AGR. Throughout calculations it is important to note annual indexing is capped at 1.200 and cupped at 0.800. Next the average of the previous ratios is calculated and raised to the fourth power to determine, what is referred to as, the indexing trend factor. Similar to annual indexing, the indexing trend factor is cupped at 1.000. If the indexing trend factor is greater than one (indicating growth), AGRA is multiplied by its corresponding indexing trend factor. However, if the value is less than one indexing does not occur, hence there will be no resulting adjustment to AGRA. Depending upon the scenario, the Approved Adjusted Gross Revenue (AAGR), from Equation 5, will be determined one of two ways. First, assuming conditions for income indexing were satisfied, AAGR is based on the lesser of Indexed Adjusted Gross Revenue (IAGR) from Equation 4 or EI. A second procedure, assuming income indexing conditions were not satisfied, will establish the guarantee based on the lesser of AGRA or EI. However the guarantee is established, AGR-Lite selects the lesser of the two as a preventative measure against "over insuring." The AAGR will be used to establish contract liability and calculating the farmer premium.

Coverage Levels and Payment Rates

Producers are able to select from three Coverage Levels (CL) (65%, 75%, and 80%) with an indemnity Payment Rate (PR) of 75% and 90% of AGR. Table 3.2 summarizes coverage levels, payment rates, and limitations for the AGR-Lite policy. For

each combination of CL and PR there is a corresponding maximum liability. AGR-Lite liability (AGRL) is calculated by multiplying AAGR by the selected CL and PR (Equation. 6). These maximum liabilities represent the maximum AAGR an individual may generate and remain eligible for AGR-Lite due to the $1 million maximum liability guarantee authorized by the contract. Furthermore, eligibility for AGR-Lite is contingent on minimum commodity requirements authorized for available CLs. Reducing the minimum commodity requirement to one ensures virtually all individuals "qualify" for 65% and 75% coverage levels. Eligibility for the 80% coverage level requires farm managers be engaged in the production of three or more commodities. As such greater diversification of farm enterprises lends itself to increased protection or coverage.

Table 3.2 Summary of protection levels and limits and government subsidy levels

Coverage Level	Payment Rate	Minimum # of Commodities[1]	Maximum Annual Income[2]	Government Subsidization
65%	75%	1	$2,051,282	59%
65%	90%	1	$1,709,401	59%
75%	75%	1	$1,777,777	55%
75%	90%	1	$1,481,481	55%
80%	75%	3	$1,666,666	48%
80%	90%	3	$1,388,888	48%

[1]Minimum # of commodities indicates the minimum number of commodites an individual must produce to be eligible for the corresponding coverage level and payment rate. Additionally insureds must meet minimum income requirements. To calculate minimum income requirements divide one by the number of enterprises and multiply by 0.333. The resulting decimal will be multiplied by Approved Adjusted Gross Revenue (AAGR) to determine the minimum income requirement. Commodity grouping is available for the 80% coverage level.

[2]Maximum annual income represents the maximum approved farm revenue for each coverage level and payment rate to remain eligible for Adjusted Gross Revenue-Lite (AGR-Lite) due to the $1,000,000 maximum liability allowed by the contract.

Allowable Expenses

Farm managers must maintain accurate records of expense activity throughout the insurance year. Although AEs have no impact on determining the initial guarantee, as the contract guarantees gross income not net, expense records will be referenced during the claim filing process. As discussed earlier, expenses are collected to prevent individuals from engaging in moral hazard. Furthermore, under certain criteria, expense activity may

ultimately result in adjustments to the guarantee level. Similar to AFI, a base period is established and used to derive 5-year Allowable Expense Average (AEA) from Equation 8. Consistent with AFI, the AE base period includes five years beginning the year prior to the year preceeding the insurance year (Equation 8).

Indexing and/or Factoring

Procedures used to determine Approved Allowable Expenses (AAE) for the current insurance year, in Equation 12, are dependent upon procedures applied to AFI. When conditions for income indexing are satisfied, one of two procedures will follow. First, an expense indexing trend factor will be calculated (following methods and procedures used for AFI), illustrated in Equation 10. If conditions for income indexing were satisfied, AEA, from Equation 8, is multiplied by the resulting expense indexing trend factor, computed in Equation 10. However, continuing with the assumption income indexing occurred, and IAGR (Equation 4) is greater than AAGR (Equation 5) which is greater than the AGRA (Equation 2), the individual "qualifies" for factoring up. Refer to Equation 11 for the mathematical explanation of factoring up. The factoring up procedure also accounts for farm expansion however, to a lesser degree than that by indexing. Factoring up ensures a proportional adjustment in expenses (for expansion) consistent with those for income. Factoring up recognizes the additional cost, incurred by an individual, required to generate an additional dollar of revenue. Given the above scenario holds AEA is multiplied by the ratio of AAGR to AGRA (Equation 11). Use of this calculation determines Factored Allowable Expenses (FAE) for the current insurance year. Approved Allowable Expenses (AAE), from Equation 12, hinge on the conditions existing on the income side. When conditions for income indexing are achieved, and

Equation 11 is not satisfied, AAE will be appraised at the resulting value from factoring up. Otherwise AAE will be based on Indexed Allowable Expenses (IAE).

Alternatively, in the absence of income indexing, expenses may be factored down proportionally to capture a reduction in farm size. Here factoring down recognizes that as AFI declines so to should AE. Procedures for factoring down are applied when AAGR is less than AGRA. Given the previous condition, AEA is multiplied by the quotient of AAGR to AGRA (Equation 11). In the absence of income indexing, and accounting for current conditions, AAE will be valued at either FAE or AEA. Examples for indexing and factoring are illustrated with Equation 11.

Indemnity Calculation

If during production or harvest periods the farm manager suffers a loss in revenue to a given enterprise or enterprises, a claim may be filed. Whether a claim results in an indemnity is computed using the following procedures. The Production Expense Percentage (PEP) for the insurance year is calculated as a percentage of AAE by the summation of AE for the insurance year, change in Accounts Payable (AP), and change in Prepaid Expenses (PE) (Equation 13). AP and PE are included to monitor expense activity of the firm. These accrual adjustments ensure proper allocation of expenses to the year in which they are used to produce income. Increases in AP, comparing December 31 to January 1 (ending –beginning inventories) (assuming calendar year filing), meaning an increase in inputs actually received but not yet paid for, results in an AE increase for the current insurance year by the net change. PE, items that have been paid for but not yet received, will also result in adjustments to AE. When PE increases (beginning - ending inventories) AE decrease by the extent of the change. PEP, from

Equation 13, is used to determine whether an adjustment to AAGR ensues. An Expense Reduction Percentage (ERP) is calculated by subtracting PEP from 70% (Equation 14). AAGR for the current year will be adjusted downward 0.1% for each 0.1% AE falls below 70% (Equation 15). The resulting expense reduction (ER), from Equation 15, is subtracted from AAGR, resulting in an Adjusted AAGR (ADJAAGR) (Equation 16). Expenses in excess of 70% require no adjustment to AAGR. When AAGR warrants adjustment the AGR Loss Inception Point (AGRLIP) requires recalculation by multiplying ADJAAGR by the elected CL (Equation 17). Subsequently AGRC for the insurance year, derived in Equation 18, is computed and subtracted from the guarantee ultimately revealing whether the farm sustained a Revenue Deficiency (RD) (Equation 19). AGRC is calculated using the following items; AFI, ΔAR, ΔIN, Noninsured disaster Assistance Payments (NAP), Net Gain from Commodity Hedging (NGCH), Gross Crop Insurance Indemnity Payments (GCIIP), Sugarbeet Payment in Kind (SPIK), and Marketing Orders-cranberry and tart cherries (MO) (Equation 18). Refer to Figure D.4 in Appendix D for a breakdown of these and other agricultural program payments. Furthermore Figure D.4 identifies which programs to include in calculating AGRA and which to include in determining AGRC against the guarantee. NAP payments are excluded from AFI but included in AGRC. GCIIP are also included in determining AGRC for the current insurance year. These payments are included to prevent insured's from "double dipping", or collecting for the same loss twice. Given an individual sustained a RD (Equation 19) an Indemnity (ID) is paid to the extent the payment rate allows, 75% or 90% of AAGR (Equation 20).

Premium Calculation

To determine a net gain from AGR-Lite, corresponding premiums would need subtracting out. The explanation that follows reflects the derivation of premiums used for this study. Since this paper evaluates AGR-Lite as stand alone product, equations for the premiums used in the analysis are located in AGR-Lite mathematical derivation, Equation 21. Three premium rates were calculated and used to conduct the analysis. The first analysis calculated an Actuarially Fair Premium by Farm (AFPF) such that each farms annual premium was equal to the total indemnities over the seven year evaluation period, divided by seven (Equation 21a). We assumed the farms would enroll in the program each year. Equation 21b computes an Actuarially Fair Average Rate (AFAR) by dividing total indemnities over the seven year period by total liability for all farms over the seven year period. This was performed for each farm category. The average rate was then applied to each farm within the category it was derived from. Notice in each of the equations there is no consideration given to government subsidization, liability from other insurance products, and administrative fees due to analysis of AGR-Lite as a stand-alone program. Thirdly, Equation 21c calculates an Actuarially Fair Average Rate for farms that received at least one Indemnity payment (AFARI). This calculation was performed for each farm category by dividing total indemnities by total liabilities for only those farms receiving at least one indemnity over the seven year period. This rate was then applied to each farm in the entire category.

A discussion of total farmer paid premium (TFPP) assuming AGR-Lite was used in conjunction with alternative insurance programs follows. Derivation of TFPP, defined by the contract, is explained in Appendix B. Assuming AGR-Lite is used in conjunction

with alternative programs, calculation of TFPP will follow. Individuals can reduce the liability, which directly affects the premium paid, by the minimum of the total Liability from Other Insurance Products (LOIP) or 50% of AGRL (from Equation 6). The resulting value is multiplied by the premium rate determined through RMA's rating program. Multiply the resulting value by one minus the government subsidy rate (SR) (59%, 55%, and 48%) for CL (65%, 75%, and 80%). Each contract will also incur a $30 administrative fee.

3.5.2 Methods for AGR-Lite Analysis

As previously mentioned, a panel data set was compiled from the KFMA data bank to analyze AGR-Lite and its impact on AGRC and NFI for 219 SE Kansas farms. To accurately evaluate the effectiveness of AGR-Lite income tax records from each farm would be required. Although the KFMA data bank does not contain individual tax records annual farm level data from 1993 to 2005 was used to reproduce the information necessary to evaluate AGR-Lite.

AGR-Lite was examined under six scenarios for its relative risk reduction using generated AGRC and NFI distributions with and without participation in the AGR-Lite program. To do so analysis proceeded under the following assumptions; first, each farm qualified for AGR-Lite coverage; second, each farm would insure every year over the seven year period; and third, every farm would select 75% CL and 90% PR. The first examines program performance assuming AFPF. It is through actuarially fair premiums which allow comparison of risk reduction effectiveness of the program excluding administrative costs and subsidies (Williams et al, 1993). A second analysis established premium rates using AFAR. This scenario also excludes consideration of additional

administrative fees as well as corresponding government subsidization. The final analysis computed AFARI for each farm category then applied the rate to the entire group. Each premium rate calculation was imposed on each category (total, crop, livestock, beef, and dairy) to evaluate AGR-Lite performance. Then each premium rate scenario was applied to only farms with claims to evaluate the impact under the assumption farms could perfectly adverse select. In other words, what impact did AGR-Lite have for farms that actually received claims.

Crop farms were selected for further analysis by sorting them into farm size categories using Value of Farm Production (VFP). Farms were assigned to one of four VFP categories; (1) less than $100,000, (2) $100,000 to $249,999, (3) $250,000 to $500,000, and (4) greater than $500,000. Here again each VFP category was analyzed under each premium rate calculation. Then the categories were examined with only farms which received at least one claim.

Risk Analysis

To measure the potential risk reduction from participation in AGR-Lite, means, standard deviations, minimums, Coefficient of Variation (CV) statistics, and Certainty Equivalents (CE) of the distribution of income measures with and without participation in AGR-Lite were generated and compared under AFPF, AFAR, and AFARI. Downside Risk (DR) was also computed with and without participation in AGR-Lite for AFAR and AFARI.

Risk can be assessed in numerous ways, but perhaps the most common method is through variability or dispersion of risk. Variability can be assessed through ranges (minimum and maximum), standard deviation, and CV. Standard deviations measure the

dispersion or volatility within a given distribution. Furthermore, they indicate the probability a given outcome will deviate from a central tendency or mean. Although standard deviations do present some perspective on the absolute variability for a given farm, when conducting cross comparison analysis of strategies with varying size means CV statistics are useful as they provide a relative measure of variability. The CV criterion advises a decision maker to consider the relative amount of risk for a given strategy. As such, decision makers with linearly risk averse behavior should select the alternative providing the smallest risk (standard deviation) relative to the expected return (mean), more simply the risk return trade off. In this analysis the CV approach is preferred due to the range of mean AGRC and NFI across categories. Additionally use of CV statistics allowed for measuring the relative difference between alternatives thereby revealing the relative reduction in AGRC and NFI from participation in AGR-Lite. In generating CV statistics, farms were encountered with negative average NFI and AGRC. As a result negative CV statistics were obtained which for practical purposes cannot be interpreted. Thus it was determined farms with negative values would be eliminated for reporting purposes.

Certainty Equivalents (CE)

Certainty equivalents were computed to compare AGRC with and without participation in the AGR-Lite program. The alternatives with the largest CE are preferred to those will lower CEs. Certainty equivalents reveal the dollar amount required by a farm manager to be indifferent between a certain value (mean of the distribution) and the risky strategy (in this case the variability in AGRC over the seven years). For individuals classified as risk averse, CE will be less than the expected value (mean). CEs were

generated assuming a logarithmic utility function which conforms to the following equation

(3.1.1) $U = \ln(W)$

where U is the utility and w denotes some initial level of wealth. Table 3.3 provides a CE example calculation. A logarithmic utility function was selected for its association with decreasing absolute risk aversion. According to Hardaker, Hurine and Anderson, "most people will be decreasingly averse to risk if they grow richer (1997)." Risk premiums can be calculated for each farm by subtracting the CE of the less preferred alternative from the CE of the preferred alternative. The difference between CEs reflects the minimum dollar value a farm manager would need to receive to justify a switch to the less preferred alternative. CEs were computed for each farm using AGRC, evaluated, and compared under AFPF, AFAR, and AFARI.

For most applications a net measure is preferred when conducting risk analysis, in this case CE. It was determined to proceed with CE analysis using AGRC instead of AFI for the following reasons. Although use of a net figure is preferred for risk analysis, given the presence of negative NFI values, it was necessary to select a measure which closely paralleled NFI. With numerous negative NFI observations, CE analysis would proceed with use of a gross measure (AFI or AGRC) to insure positive values. Some previous literature (Carriker et al, Schnitkey et al, and Gray et al) have conducted risk analysis with the use gross receipts. To obtain results that would in some way reflect NFI, correlation coefficients were computed between AGRC and NFI and AFI and NFI with and without adjustments. Adjustments made to AFI, NFI, and AGRC consider premium costs, whether from AFPF, AFAR, and AFARI, and any indemnity payments

received by the farm. Therefore correlations were calculated between measures using raw, or unadjusted values, and then computed by adding indemnity payments and subtracting corresponding premium costs. Tables 3.4 and 3.5 reveal correlations between AGRC and NFI to be consistently higher as compared to those between AFI and NFI. In most instances correlations decline when including adjustments from calculations. When including adjustments a greater percentage of farms reported weak positive correlations ranging from 0.186 to 0.317 between AFI and NFI. Correlations between AFI and NFI across categories ranged from -0.962 to 0.962 (very strong negative correlation to very positive correlation).

Correlations between AGRC and NFI were consistently higher than those previously discussed, ranging from 0.490 to 0.586, indicating a moderate positive correlation. The range of correlations across farms ranged from -0.745 to 0.995. Also, farms with positive correlations increased for all categories ranging from 85% to 100%. As a result fewer farms reported negative correlations.

Table 3.3 Certainty Equivalent (CE) example calculation

	AGRC	ln (AGRC)	Calculation explanation
1999	$49,436	10.81	ln($49,436) = **10.81**
2000	$18,312	9.82	ln($18,312) = **9.82**
2001	$59,230	10.99	ln($59,230) = **10.99**
2002	$35,821	10.49	ln($35,821) = **10.49**
2003	$41,950	10.64	ln($41,950) = **10.64**
2004	$43,211	10.67	ln($43,211) = **10.67**
2005	$27,072	10.21	ln($27,072) = **10.21**
Average	($39,290)[1]	(10.52)[2]	
Certainty Equivalent (CE) =	**$36,962**		exponential(10.52) = **$36,962**

[1]Average Adjusted Gross Revenue to Count (AGRC) was computed by averaging years 1999 to 2005 {average($49,436, $18,312, $59,230, $35,821, $41,950, $43,211, $27,072) = $39,290}

[2]Average ln(AGRC) was computed by first taking the log of each AGRC from 1999 to 2005. Then average ln(AGRC) over the years 1999 to 2005 {average(10.81, 9.82, 10.99, 10.49, 10.64, 10.67, 10.21) = 10.52}

Table 3.4 Correlation coefficients between AFI and NFI with and without adjustments by category

	Dairy		Beef		Livestock		Crop		Total	
	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims
	Correlation between AFI and NFI with adjustments [1]									
Total Farms	13	4	64	33	93	46	126	107	219	153
Average	0.317	0.238	0.229	0.316	0.255	0.299	0.229	0.186	0.239	0.219
Min	-0.766	-0.384	-0.848	-0.848	-0.847	-0.847	-0.925	-0.925	-0.927	-0.927
Max	0.910	0.908	0.962	0.906	0.962	0.936	0.902	0.895	0.962	0.937
Number of Positive[2]	10	3	42	26	63	34	87	69	151	104
	(76.92)	(75.00)	(65.63)	(78.79)	(67.74)	(73.91)	(69.05)	(64.49)	(68.95)	(67.97)
Number of Negative[3]	3	1	22	7	30	12	39	38	68	49
	(23.08)	(25.00)	(34.38)	(21.21)	(32.26)	(26.09)	(30.95)	(35.51)	(31.05)	(32.03)
	Correlation between AFI and NFI without adjustments [4]									
Total Farms	13	4	64	33	93	46	126	107	219	153
Average	0.349	0.339	0.199	0.255	0.250	0.289	0.355	0.333	0.311	0.320
Min	-0.764	-0.378	-0.690	-0.690	-0.764	-0.690	-0.727	-0.727	-0.764	-0.727
Max	0.913	0.913	0.961	0.843	0.961	0.936	0.925	0.925	0.961	0.936
Number of Positive[2]	10	3	40	24	65	36	104	86	169	122
	(76.92)	(75.00)	(62.50)	(72.73)	(68.89)	(78.26)	(82.54)	(80.37)	(77.17)	(79.74)
Number of Negative[3]	3	1	24	9	28	10	22	21	50	31
	(23.08)	(25.00)	(37.50)	(27.27)	(30.11)	(21.74)	(17.46)	(19.63)	(22.83)	(20.26)

[1]Correlations between Allowable Farm Income (AFI) and Net Farm Income (NFI) with adjustments indicates AFI and NFI have been adjusted to include coresonding premium costs and indemnities

[2]Number of postive indicates the number of farms with postive correlation between AFI and NFI for each category with percentages in parentheses below

[3]Number of negative indicates the number of farms with negative correlation between AFI and NFI for each category with percentages in parentheses below

[4]Correlation between AFI and NFI without adjustments indicates the use of AFI and NFI values prior to consideration of corresponding premium costs and indemnities

Note: All farms reflects the correlations from all farms regardless of whether a claim was received. Farms with claims reflects the correlations for only farms which received at least one claim.

Table 3.5 Correlation coefficients between AGRC and NFI with and without adjustments by category

	Dairy		Beef		Livestock		Crop		Total	
	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims	All farms	Farms w/ claims
	Correlation between AGRC and NFI with adjustments [1]									
Total Farms	13	4	64	33	93	46	126	107	219	153
Average	0.490	0.586	0.512	0.481	0.515	0.510	0.545	0.515	0.530	0.510
Min	-0.166	0.294	-0.551	-0.551	-0.551	-0.551	-0.745	-0.745	-0.726	-0.726
Max	0.944	0.944	0.958	0.946	0.958	0.946	0.995	0.995	0.995	0.995
Number of Positive[2]	12	4	56	28	81	39	113	94	194	133
	(92.31)	(100)	(87.50)	(84.85)	(87.10)	(84.78)	(89.68)	(87.85)	(88.58)	(86.93)
Number of Negative[3]	1	0	8	5	12	7	13	13	25	20
	(7.69)	(0)	(12.50)	(15.15)	(12.90)	(15.22)	(10.32)	(12.15)	(11.42)	(13.07)
	Correlation between AGRC and NFI without adjustments [4]									
Total Farms	13	4	64	33	93	46	126	107	219	153
Average	0.522	0.693	0.593	0.637	0.589	0.659	0.697	0.693	0.651	0.683
Min	-0.164	0.455	-0.183	-0.183	-0.409	-0.183	-0.369	-0.369	-0.409	-0.369
Max	0.952	0.952	0.982	0.982	0.982	0.982	0.996	0.996	0.996	0.996
Number of Positive[2]	12	4	59	31	86	44	123	104	209	148
	(92.31)	(100)	(92.19)	(93.94)	(92.47)	(95.65)	(97.62)	(97.20)	(95.43)	(96.73)
Number of Negative[3]	1	0	5	2	7	2	3	3	10	5
	(7.69)	(0)	(7.81)	(6.06)	(7.53)	(4.35)	(2.38)	(2.80)	(4.57)	(3.27)

[1]Correlation between Adjusted Gross Revenue to Count (AGRC) and Net Farm Income (NFI) with adjustements indicates AGRC and NFI have been adjusted to include corresonding premium costs and indemnities

[2]Number of postive indicates the number of farms with postive correlation between AGRC and NFI for each category with percentages in parentheses below

[3]Number of negative indicates the number of farms with negative correlation between AGRC and NFI for each category with percentages in parentheses below

[4]Correlation between AGRC and NFI without adjustments indicates the use of AGRC and NFI values prior to consideration of corresponding premium costs and indemnities

Note: All farms reflects the correlations from all farms regardless of whether a claim was received. Farms with claims reflects the correlations for only farms which received at least one claim.

Downside Risk (DR)

Another measure, and possibly the most revealing, used to analyze risk reduction effectiveness of AGR-Lite was DR. As the name would imply, DR reveals the maximum downside potential a given alternative or strategy exhibits relative to some pre-specified threshold. In many respects DR establishes a safety first criteria for which a decision maker selects the strategy with the highest mean net return that fails to have a single outcome below some pre-specified level. Although DR does not operate under the same assumptions, it does establish a pre-specified level for which to quantify DR. For this analysis Family Living (FL) costs, using a Kansas state wide family living measure, were obtained to establish the pre-specified level. This value was multiplied by the number of operators per farm to identify the threshold and then subtracted from NFI to assess DR. DR was calculated by subtracting Family Living Expense (FLE) from NFI with and without participation in AGR-Lite. FLE was calculated by multiplying FL by the number of operators per farm. DR was calculated using the following formula:

(3.1.2) DR = NFI - FLE

Results were computed and compared under AFAR and AFARI premium calculations. Table 3.6 provides an example for calculating DR.

Table 3.6 Downside risk (DR) example calculation

	NFI w/out AGR-Lite	NFI w/ AGR-Lite	FLE[1]	DR w/out AGR-Lite	DR w/ AGR-Lite	Change[2]
1999	-$21,802	$5,749	$31,258	-$53,060	-$25,509	$27,551
2000	$22,856	$20,112	$31,730	-$8,402	-$11,146	-$2,744
2001	$29,880	$27,236	$36,332	-$1,378	-$4,022	-$2,644
2002	$23,949	$21,183	$36,635	-$7,309	-$10,075	-$2,766
2003	$3,560	$835	$38,989	-$27,698	-$30,423	-$2,725
2004	$55,826	$53,105	$41,365	$24,568	$21,847	-$2,721
2005	$92,007	$88,932	$44,864	$60,749	$57,674	-$3,075
Average	$29,468	$31,022	$37,310	-$1,790	-$236	$1,554

[1]Family Living Expense (FLE) was calculated by multiplying the Kanasas average family living cost by the number of farm operators (family living cost x # farm operators)

[2]Change is the difference between Downside Risk (DR) w/ AGR-Lite and DR w/out AGR-Lite

Note: Downside Risk (DR) was calculated by subtracting FLE from Net Farm Income (NFI) with and without participation in AGR-Lite (DR = NFI - FLE) over the 1999 to 2005 period

3.6 Data Limitations and Assumptions

Due to AGR-Lite procedures and filing processes, limitations were encountered and as such are addressed in the following paragraphs. Limitations and assumptions for both income and expenses are addressed separately.

Crop insurance indemnity payments, which may include payments from any of the following: APH, CRC, RA, GRP, GRIP, LGM, LRP, Private Hail and Mortality, or any product offered under the authority of the act in which an individual received proceeds from the contract are included in AGRC but are not in calculating AGRA. Although farm managers would likely enroll in alternative insurance products to supplement AGR-Lite the KFMA annual farm level data does not provide enough detail necessary to identify product specific purchases. As such it was determined the product would be evaluated as a stand-alone. Since this analysis evaluated AGR-Lite as stand-alone other crop insurance proceeds were not included in the AGR derivation. These

payments and their corresponding premiums were also excluded from the NFI calculations.

Provisions of the AGR-Lite contract specify that certain agricultural program payments will be included for AGRA calculations but not for AGRC and vice versa. Agricultural program payments, which may include Loan Deficiency Payments (LDP), Production Flexibility Contracts (PFC), Direct and Counter-Cyclical Payments (DCP), Conservation Reserve Program (CRP), and Farm Service Agency (FSA) Loans are not included in calculating AGRA or AGRC. Noninsured Crop Disaster Assistance Program payments (NAP) are not included in AGRA calculations but are for AGRC. Finally, Commodity Credit Corporation (CCC) loans are included in both AGRA and AGRC computations. Other payments used to calculate AGRA and AGRC include Surgarbeet – Payment in Kind and Marketing Orders – Cranberry and Tart Cherries. Needing to include specific payments and exclude others, the KFMA data set does not provide the necessary data to report individual program payments. Government payments are recorded in the KFMA data set however all realized payments are compiled into a single variable. It is important to note that the allowable income measure, in the AGR-Lite policy, includes some payments while excluding others. This includes the calculation of AFI in Equation 1 and income for AGRC in Equation 18. Figure D.4 in Appendix D provides a complete listing of these program payments. As Figure D.4 indicates, most government payments are omitted in the derivation of AFI and AGRC. These payments are problematic in that we are unable to isolate NAP payments, Payment in Kind, Marketing orders, and CCC loans when deriving AFI or AGRC using KFMA data. It was decided to exclude government payments from AGRA and AGRC calculations.

Therefore any agricultural program payments made, whether counting towards AGRA or AGRC, have been omitted from AGR-Lite calculations.

When establishing the contract guarantee, it becomes conditional on circumstances outlined in the contract. As discussed earlier the guarantee will be based on the lesser of AGRA, IAGR, or EI from the annual farm report. Since the analysis uses historical data (1993-2005) we are unable to determine EI for succeeding years. Hence, it was determined EI would equal AGRA. This has potential to overestimate or underestimate payouts of AGR-Lite.

Limitations also surfaced from an expense perspective. Under the provisions of the contract producers are allowed to deduct depreciation and section 179 expense deductions not claimed elsewhere, however this value will reflect only depreciation realized for animals. It is important to note that livestock depreciation is not recorded in the KFMA database, resulting in the inability to include such depreciation. Therefore depreciation expense was not included in the derivation of AE. Even so, in many cases animal depreciation is believed to be minimal.

Given an individuals eligibility for a claim, precise adjustments occur prior to receipt of a claim. The contract states raised cull cows intended for sale will be considered in AFI and will count towards AGRA. Alternatively sales of cows and other capital assets (such as breeding livestock) are not included in AFI or AGRA. This is problematic as KFMA data does not allow us to identify or link the corresponding costs associated with livestock sales in any given year. Thus, sales of cows and other capital assets, such as breeding livestock have been excluded from AGR-Lite calculations. Given that, sales of livestock may not truly reflect that which is permitted by the contract.

As part of the indemnity calculation process PEP from Equation 13 is derived. In accordance with contract filing procedures allowable expenses will be adjusted by the change in AP and PE. Within the KFMA data bank, detailed data on AP are not collected and as such have been excluded from the calculation. Therefore PE are the only accrual adjustment made to AE.

Because of data limitations the calculation of total farmer paid premium (TFPP) was not performed. One major limitation in deriving premiums was the inability to identify individual rates by farm. Thus, it was determined AGR-Lite would be analyzed under three scenarios, AFPF, AFAR, and AFARI. Accounting for AGR-Lite being analyzed as a stand-alone product the equation used to determine premiums from AFPF, AFAR, and AFARI do not conform to TFPP, defined in Equation 21, located in Appendix B. Premiums under AFAR and AFARI were computed by multiplying the computed average rate by the corresponding farms liability. As such liabilities from other insurance products have been eliminated from the equation. This is, in part, due to data limitations, which result in the inability to isolate or identify which insurance products were purchased. Without such information we are unable to extract the corresponding liability from respective contracts. In addition government subsidization and administrative fees ($30) were eliminated to simplify the premium calculation.

CHAPTER 4 - Results

4.1 Overview

AGR-Lite was examined under six scenarios for its relative risk reduction using AGRC and NFI distributions with and without participation in the AGR-Lite program. The first scenario examined program performance assuming Actuarially Fair Premium by Farm (AFPF) for all farms. A second scenario evaluated AGR-Lite computing an Actuarially Fair Average Rate for all farms (AFAR) and applying it to all farms. The third analysis used an Actuarially Fair Average Rate for farms with Indemnities (AFARI) but applied the rate to all farms. The final three scenarios are conducted in a similar fashion except the results for each scenario (AFPF, AFAR, and AFARI) exclude farms with zero claims. By eliminating farms with zero claims, AGR-Lite was evaluated assuming only farms with claims purchased the product. This analysis will reveal product performance under the assumption individuals could perfectly adverse select. These scenarios (AFPF, AFAR, and AFARI) will frame the analysis in that we would expect actual premiums to fall somewhere within the range of scenarios. In each premium category a 75% coverage level and 90% payment rate was used. Additionally, these six scenarios were applied to VFP categories for crop farms of less than $100,000, $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000.

Subsequent sections present and summarize the results obtained under each scenario for farm and VFP categories. In total 219 farms in Southeast Kansas were selected for maintaining continuous farm level data from 1993 to 2005 that was useable for analysis. Subsequent sections also present the results for 126 crop farms, 93 livestock

farms, 64 beef farms, and 13 dairy farms under each scenario. In addition results will be presented for 33 crop farms with VFP of less than $100,000, 49 crop farms with VFP of $100,000 to $249,999, 38 crop farms with VFP of $250,000 to $500,000, and 6 crop farms with VFP of greater than $500,000.

Refer to Appendix E for an explanation to assist in interpreting the results tables located at the end of Chapter 4. This appendix provides a more thorough description for each row and column as well as methods used to compute each value.

4.2 Total Results

AFPF all farms

Table 4.1 presents AGRC and NFI distributions summary statistics with and without participation in AGR-Lite including means, standard deviations, minimum, and maximum for all 219 farms in 20 counties in SE Kansas assuming AFPF. Average AFPF paid by producers was $8,224, which computes the average for only farms which paid premiums (Table 4.64). The maximum paid premium was $41,508. Average AGRC and NFI for the 219 farms from 1999 to 2005 were $203,236 and $49,284 with corresponding ranges of $15,560 to $1,160,123 and -$19,073 to $414,205. As expected, averages for AGRC and NFI under AFPF remain unchanged as a result of participation in AGR-Lite because indemnities equal premiums by farm. Initial average standard deviations for AGRC and NFI were $64,803 and $41,280. With participation in AGR-Lite, average standard deviations declined $6,424 and $2,843 respectively, a 9.9% and 6.9% decrease. Although AGRC contains greater absolute variability than NFI, CV statistics suggest otherwise. Comparatively, CV indicates greater relative risk using NFI compared to AGRC with initial CVs of 0.33 and 1.63. AGR-Lite generated a larger CV reduction for

NFI compared to AGRC. Average CV reductions for AGRC and NFI were 0.05 and 0.10. Initial minimum observations for AGRC and NFI were $118,185 and -$6,631. As expected AGR-Lite increased average minimums for AGRC and NFI, $16,333 and $6,904 respectively.

Table 4.2 presents a summary of farm numbers, premium paid, liability, and average indemnity by frequency of claim for 219 farms. Just over 30%, 66 of the 219 farms, generated zero claims, indicating nearly 70% of farms received at least one indemnity over the seven years. Furthermore 24% of farms generated a minimum of three claims. The table provides a comparison of average paid premiums for AFPF, AFAR, and AFARI. Additionally, actual premium rates were calculated for each frequency of claim by dividing total indemnities by total liabilities for farms within each frequency. As expected, farms with more frequent claims indicate greater risk, ultimately resulting in a heightened average premium rates relative to farms with less frequent claims. For AFPF, average paid premium increases with increasing frequency of claim. Conversely, average paid premiums for AFAR and AFARI declined as frequency of claim increased. These findings can be explained by two reasons. First, using AFAR and AFARI the same rate was applied to every farm irrespective of a farms frequency of claim. Secondly, average liability declines with increasing frequency of claims, thus by applying a constant percentage rate, it would naturally result in smaller premiums. Average liability was computed for each frequency of claim by averaging the liability across farms within each frequency. Across frequency of claims average liability ranged from $67,798 to $144,011. There is a definitive downward trend in average liability with increasing levels of frequency of claim. Furthermore as average liability declines, with

increasing frequency of claims, absolute variability increases. The breakdown of average indemnities by farm by year for frequencies 1 through 7 respectively were; $33,673, $23,414, $25,418, $27,766, $22,865, $18,343, and $23,156.

AFPF farms with claims

Table 4.3 reveals results for farms receiving at least one indemnity payment over the seven years assuming AFPF. Excluding farms with zero claims, 153 farms remained with average AGRC and NFI of $182,736 and $46,247. Average standard deviations declined by a greater rate, on average, $9,195 and $4,070 with participation in AGR-Lite compared to AFPF all farms. By eliminating farms with zero claims, the remaining subset posted higher initial CV values, indicating greater relative risk compared to all farms. However the average magnitude of change, occurring with AGR-Lite, was greater for farms with claims for AGRC and NFI. Average minimums pre-AGR-Lite were lower with initial values of $92,742 and -$10,957 for AGRC and NFI respectively. Results for farms with claims reveal a larger increase ($23,378) in average minimum compared to $16,333 for all farms. By eliminating farms which received no claims, thus generate no impact to average minimum, it is expected the average minimum would increase relative to all farms. Although farms with claims report an average minimum change roughly $3,000 higher than all farms, percent change proves otherwise, reporting an average percentage change 14 points lower than all farms.

AFAR all farms

A second scenario calculated an AFAR, dividing total indemnities by total liabilities for all farms. The computed rate was then applied to all farms generating the results located in Table 4.4. In doing so a 4.54% rate was applied which resulted in 219

farms paying an average $5,745 premium for AGR-Lite, which assumed it was a stand-alone product without consideration to government subsidized premium or administrative fees, illustrated in Table 4.64. Premiums ranged from $424 to $34,343. Similar to AFPF results average AGRC and NFI went unchanged. Again, establishing a rate which reflects the activity of all farms it makes sense, on average, mean AGRC and NFI remain unchanged. However the minimum average of a single farm increased from an initial $15,560 to $21,002 for AGRC. The average change in minimum average for an individual farm was -$30,602 while the maximum change was $30,961. NFI minimum average, on the other hand, actually declined from -$19,073 to -$20,493 for NFI. Average standard deviations declined post AGR-Lite $6,424 and $2,879 for AGRC and NFI. With comparable standard deviation reductions, CV reductions were virtually similar. The magnitude with which average minimums increased were slightly higher compared to those from AFPF, with increases of $16,486 and $7,013 for AGRC and NFI.

AFAR farms with claims

Excluding farms with zero claims and maintaining AFAR (4.54%), the following reflects the results from 153 farms (Table 4.5). These 153 farms paid, on average, $5,474 for AGR-Lite (Table 4.64). Pre AGR-Lite average AGRC and NFI remain constant at $182,736 and $46,247. Applying AFAR, computed from all farms, average AGRC and NFI increased $2,750. Mean income measures increase due to the elimination of farms receiving zero claims with reduced averages due to the associated cost of insurance. Following elimination of farms with zero claims, comparison of initial standard deviation reveals heightened absolute variability in AGRC ($66,144) however less for NFI ($41,103). Overall changes in average standard deviation were greater compared to all

farms, decreasing $9,142 and $4,087. Additionally, reductions in relative risk declined further for AGRC to 0.08 and even greater for NFI (0.39). Compared to AFPF, AFAR resulted in a similar reduction for AGRC and almost tripled the reduction for NFI. As for average minimums, the 153 farms with claims sustained further increases, averaging $26,285 and $12,746 for AGRC and NFI.

AFARI all farms

An AFARI of 6.8% was computed using farms receiving a minimum of one indemnity over the seven year period (Table 4.64). Summary results of AGRC and NFI distributions for 219 farms assuming AFARI are located in Table 4.6. Initial average AGRC and NFI remained constant, however when applying the 6.8% rate, assuming AGR-Lite participation, overall average AGRC and NFI declined $2,886. Application of AFARI, which reflects activity from only farms with claims (6.8%), exceeds the 4.54% AFAR. That said a higher rate increases the average paid premium, causing farms without claims to incur steeper costs of insurance leading to an overall reduction in mean AGRC and NFI. In comparison of results, the minimum average observation for AGRC increased to $20,606, which was smaller compared to AFAR. Additionally NFI average minimum declined further, in comparison to AFAR, to -$21,206. Absolute variability, using standard deviation, declined 9.9% for AGRC which parallels that from AFPF and AFAR. NFI, however, reduced average standard deviation 7%, the largest relative to AFPF and AFAR. Furthermore relative risk reduction for AGRC was equivalent in comparison to AFPF and AFAR. Surprisingly, relative risk with participation in AGR-Lite, increased for NFI from 1.29 to 1.53, which suggests the exact opposite from AFPF and AFAR. This finding is attributed to an individual farm realizing a substantial

increase in relative risk. Use of AFARI (highest premium) resulted in the greatest reduction in average NFI, drawing the average considerably lower in comparison to AFPF and AFAR. With relatively unchanged standard deviations, it makes sense to see a sizeable increase in relative risk. Upon removal of the individual farm, average relative risk for all farms indicates a reduction instead of an increase, consistent with AFPF and AFAR. With AGR-Lite AGRC and NFI average minimums increased $13,666 and $4,173, the lowest reported increases comparing all scenarios (AFPF, AFAR, and AFARI).

AFARI farms with claims

Continuing with a 6.8% rate, the following results reflect farms receiving at least one claim (Table 4.7). Pre and post AGR-Lite averages of AGRC and NFI remain unchanged at $182,736 and $46,247. This was expected as the average rate was computed to reflect farms which received claims, thus with an actuarially fair rate, on average, premiums will equal indemnities. Standard deviations declined on average $9,113 and $4,091 for AGRC and NFI respectively. Interestingly, in a comparison excluding farms with zero claims, AFARI reported the smallest decrease in standard deviation for AGRC relative to AFPF and AFAR; however AFARI mounted the largest average reduction for NFI. Consistent with previous findings, average relative risk reduction for AGRC was virtually unchanged from AFPF and AFAR. NFI, on the other hand, reveals an increase in relative risk, the only increase compared to AFPF and AFAR. Lastly, average minimums increased, on average, $23,600 and $10,041 for AGRC and NFI which ranked second to AFAR.

Summary of Total Farms

Overall, results for NFI indicate for 219 farms, participation in AGR-Lite reduced standard deviations and relative risk for all farms and farms with claims. However, AFARI resulted in increases in relative risk for NFI. Average minimums increased under every scenario for all farms and farms with claims. The impact of AGR-Lite on standard deviation, CV, and minimum was in most cases larger when excluding farms with zero claims, which is expected.

4.3 Category Results

4.3.1 Crop Farms

AFPF all farms

There were 126 crop farms with an average paid AFPF of $8,778 (average of farms with premiums) and a $41,508 maximum (Table 4.64). Table 4.8 presents the summary statistics for AFPF results. Average AGRC and NFI for the 126 crop farms were $192,445 and $46,005 with respective ranges of $15,560 to $1,034,902 and -$10,968 to $264,961. Average standard deviations were reduced with AGR-Lite, on average, $8,595 and $4,851 for AGRC and NFI. CV statistics reveal AGRC contains less relative risk in comparison to NFI with initial values of 0.37 and 2.07. With participation in AGR-Lite, average CV declined 0.06 and 0.16 for AGRC and NFI. Initial average minimums were $98,362 and -$13,789. Through AGR-Lite, average minimums increased 21.3% and 77.3% for AGRC and NFI. These percentages equate to a $20,925 and $10,653 increase.

Table 4.9 presents the summary for 126 crop farms by frequency of claim. Assuming AGR-Lite participation for years 1999 through 2005 19 farms generated zero

claims. The remaining 107 (85%) received at least one claim over the seven years. Compared to all farms, 33% of crop farms generated a minimum of three claims over seven years. Consistent with the all farm category, average liability declined with increasing frequency of claim. Furthermore, as claims became more frequent, mean standard deviation increased. Average liability ranged from $48,850 to $132,069. Again, as expected, average AFPF increases with increasing frequency of claim. AFAR and AFARI average premium paid declined as claims became more frequent. Again considering application of constant rate and the decreasing average liability seen with increasing frequency of claim these results make sense. Average indemnities per farm per year for frequencies 1 through 7 respectively were $33,689, $27,572, $26,848, $26,233, $20,381, $14,910, and $23,156.

AFPF farms with claims

Table 4.10 presents the summary results for an AFPF excluding farms with zero claims. As a result 19 farms were eliminated, leaving 107 farms for analysis. The average premium paid by the 107 farms was $8,788 (Table 4.64). Average initial AGRC and NFI declined to $182,705 and $43,199 but remained unchanged as a result of participation in AGR-Lite. Comparing initial standard deviations of AGRC and NFI, farms with claims exhibited less variability than the 126 total. Furthermore the average reduction in relative risk remains unchanged from all farms. When eliminating farms with zero claims, relative risk for NFI declined, on average, 0.20. Consistent with previous findings, elimination of farms with zero claims improves average minimum increases for AGRC and NFI to $24,640 and $12,544. Despite NFI generating a larger

increase overall in average minimum change, when computed as a percent the change was actually lower in comparison to all farms.

AFAR all farms

Dividing total indemnities by total liabilities, for 126 crop farms, resulted in an AFAR of 6.24%. The corresponding results are located in Table 4.11. The derived rate generated an average premium of $7,454 with a minimum of $655 and maximum of $45,721 (Table 4.64). Average AGRC and NFI with and without participation in AGR-Lite remain similar and unchanged from AFPF. Comparing average standard deviation reductions with those of AFPF, reveals less of an improvement for AGRC but greater for NFI. Relative risk reductions for AGRC were slightly higher compared to AFPF. Conversely, initial relative risk dropped to 1.49 compared to 2.07 for AFPF. The average reduction in CV declined 0.04 for NFI, which was much less than the 0.16 for AFPF. AGR-Lite increased average minimum, on average, $21,212 and $11,024. AFAR resulted in a greater improvement in average minimum for both AGRC and NFI compared to AFPF.

AFAR farms with claims

Eliminating farms with zero claims, 107 crop farms remained. Applying the average rate (6.24%) computed above, the following reflects the results from those 107 farms and are summarized in Table 4.12. Using a 6.24% rate, mean paid premium was $7,358 with a $655 low and $33,008 high (Table 4.64). Average AGRC and NFI increased $1,419 with AGR-Lite assuming AFAR. Furthermore an individual farms minimum average improved to $20,707 for AGRC and -$7,170 for NFI. Average standard deviation declined $10,002 for AGRC, which was less compared to AFPF.

However a $5,761 reduction in average standard deviation for NFI exceeded that for AFPF. Initial and final CV values for AGRC replicate those from AFPF. In using an ARAF these 107 farms generated the largest increase in average minimum across scenarios. Average minimums for AGRC and NFI increased $26,308 and $14,255 respectively.

AFARI all farms

In this scenario a rate was calculated using only farms with claims which resulted in an AFARI of 7.4%. Results are summarized in Table 4.13. Applying a 7.4% rate to 126 crop farms, Table 4.64 summarizes the average paid premium ($8,892) with a minimum of $781 and maximum of $54,540. This rate resulted in a $1,438 reduction in average AGRC and NFI. This was expected due to the higher rate and the inclusion of all farms. AGR-Lite reduced average standard deviation $8,527 for AGRC, the lowest reduction in comparison to AFPF and AFAR. However the $4,948 average standard deviation reduction in NFI was the largest compared to AFPF and AFAR. Results for CV remain similar to all scenarios. Compared to AFPF and AFAR for NFI, initial relative risk was the lowest at 1.44. Furthermore, AFARI corresponded with a relative reduction of 0.14, which ranked second behind AFPF. Minimum averages improved for AGRC and NFI, albeit to a lesser degree in comparison to AFAR. Differences in minimum average correspond to application of a higher rate, ultimately increasing the premium paid.

AFARI farms with claims

Using a computed rate of 7.4% of liability, 107 farms remained after excluding farms with zero claims. Average premium paid ranged from $781 to $39,376 with a

$8,778 mean (Table 4.64). These results are presented in Table 4.14. The range of minimum and maximum average change for AGRC shrunk to -$27,701 to $24,222 for farms with claims from -$48,402 to $24,222 range from all farms. These results are consistent with AFAR. Farms with claims exhibited less initial variability and sustained larger increases compared to all farms. In comparison, AFPF and AFAR reductions in standard deviation faired better for AGRC but worse for NFI with AFARI. In addition to having the smallest initial CV (1.50), AFARI marked the largest average reduction (0.30) compared to AFPF and AFAR for NFI. AGR-Lite's impact on average minimum was greater for farms with claims compared to the entire sample. Average increases in average minimum were $24,928 and $12,880 for AGRC and NFI, to which each ranked second to AFAR but ahead of AFPF.

Summary of Crop Farms

For all farms and farms with claims for NFI, participation in AGR-Lite consistently reduced standard deviations and relative risk. Average minimums benefited with participation in AGR-Lite with increases for all farms and farms with claims. As expected, in most instances exclusion of farms with zero claims enhances the overall impact of AGR-Lite.

4.3.2 Livestock Farms

AFPF all farms

There were 93 farms which averaged 50% or more of income from livestock over the 1993 to 2005 period. Assuming indemnities equal premiums by farm, livestock farms paid on average $6,621 with a $121 to $28,383 range (Table 4.64). A summary of results for AFPF are presented in Table 4.15. As expected mean AGRC and NFI pre and post

AGR-Lite remain unchanged at $217,856 and $53,727. With 93 farms, average reductions in standard deviations for AGRC and NFI were $3,334 and $121. Standard deviation, as a percent of mean, reveals very little change for both AGRC and NFI. Average reductions were 0.03 and 0.01. Average minimums for AGRC and NFI increased 6.5% ($9,508) and 64.5% ($1,980) respectively.

Table 4.16 presents the summary by frequency of claim results for 93 livestock farms in SE Kansas. Of the 93 farms, 47, or just over 50%, received zero claims. In comparison to crop farms and all farms, just over 11% of livestock farms received three or more claims. Within the table is a summary comparison of average paid premium for AFPF, AFAR, and AFARI. Consistent with previous findings, average paid premium increases for AFPF as claim frequency increases, whereas average paid premium declines for AFAR and AFARI as claims became more frequent. Average liability does not exhibit the similar downward trend that was observed for all farms and crop farms. However as claim frequencies increased fewer farms resided in higher frequency categories. Average liability ranged from $72,152 to $166,190. Consistent with crop and all farm categories, mean variability increased with increasing frequency of claim. Lastly, the average indemnity by farm by year for frequencies 1 through 6 respectively were $33,642, $11,916, $18,594, $36,196, $26,176, and $21,777.

AFPF farms with claims

Eliminating farms with zero claims, 46 livestock farms remained with an average paid premium of $6,621 (Table 4.64). Premiums ranged from $121 to $28,383. Average AGRC and NFI, for only farms with claims, were smaller in comparison to all livestock farms at $182,809 and $53,336 (Table 4.17). Overall reductions in average standard

deviation more than doubled relative to all livestock farms, with reductions of $6,741 and $244 for AGRC and NFI. Relative to all livestock farms, initial absolute variability for farms with at least one claim increased to $57,182. Equally alike, initial relative risk adjusted higher to 0.33 and 1.18 for AGRC and NFI. With that, farms with claims did realize greater reductions, however rather minimal at 0.06 and 0.03. Moreover average minimum AGRC and NFI nearly doubled that for all farms with averages of $19,223 and $4,002. Furthermore AGR-Lite increased the minimum average minimum, for one farm, from -$24,742 to $10,737 however, actually increased for NFI from -$76,207 to -$76,290.

AFAR all farms

The following reflects the results from 93 livestock farms obtained using an AFAR (2.41%) calculated by dividing total indemnities by total liabilities for the 93 farms (Table 4.18). As such farmer paid premium ranged from $225 to $18,203 with a $3,275 mean (Table 4.64). Give that, average reductions to standard deviations were comparable with AFPF for AGRC and NFI. With identical initial CV for AGRC and NFI, average reductions increased to 0.04 and 0.08, relative to AFPF. Average minimums increased as a result of AGR-Lite participation albeit to a greater extent for AGRC than NFI compared to AFPF. Average increases were $9,542 and $1,921.

AFAR farms with claims

Excluding farms with zero claims average paid premium declined to $3,047 with a $316 to $18,203 range (Table 4.64). Average AGRC and NFI declined from the all farm level to $182,809 and $53,336. With a 2.4% applied rate mean AGRC and NFI, for 46 farms, increased $3,574 (Table 4.19). When including all farms, averages included

farms which paid a premium but received no indemnity. As expected, farms with zero claims reduced average NFI by the premium cost. When excluding those farms the AFAR underestimates the rate, thus farms with claims are paying less for the product which ultimately leads to an increase in averages. Average standard deviations were reduced $6,748 for AGRC, which exceeded that for AFPF; however NFI average standard deviation declined $225, nearly $20 less than AFPF. CV values indicate a greater reduction for NFI (0.32) than AGRC (0.08). Both reductions surpass those assuming AFPF. Increases in average minimum improved from AFPF, averaging $22,839 and $7,513 for AGRC and NFI.

AFARI all farms

Dividing the sum of indemnities by sum of liabilities, including only farms with claims, resulted in an AFARI of 5.2% (Table 4.64). Operating on the applied the rate 93 livestock farms paid, on average, $7,117 for AGR-Lite. Paid premiums ranged from $489 to $39,559. Initial mean AGRC and NFI were $217,856 and $53,727, located in Table 4.20. By adding indemnities and corresponding premiums, these means declined $3,842. Here again, application of a rate to all farms, exceeding AFAR (2.4%), which resulted from the use of only farms with claims (5.2%), it makes sense considering the higher costs of insurance. Under AFARI AGRC ushered the largest reduction in average standard deviation relative to AFPF and AFAR. Conversely AFARI resulted comparatively in the smallest reduction for NFI to AFPF and AFAR. Participation in AGR-Lite reduced average minimum for AGRC by $5,738, the lowest increase compared to AFPF and AFAR. In contrast, results indicate a reduction in average minimum from $3,067 to $1,071 for NFI.

AFARI farms with claims

The following results reflect farms with claims with the assumption only farms receiving claims purchased AGR-Lite (Table 4.21). Average premiums paid, which result from a 5.2% rate, ranged from $686 to $39,559 with a $6,621 mean (Table 4.64). Average AGRC and NFI for 46 livestock farms remained unchanged from initial values of $182,809 and $53,336. The average reduction in standard deviation was highest for AGRC and lowest for NFI compared to AFPF and AFAR. Second to AFAR, AGR-Lite reduced relative risk 0.07 and 0.20 for AGRC and NFI. With AGR-Lite farms increased their average minimum $19,310 and $3,855 which, in comparison, rank second and third relative to AFAR and AFPF.

Summary of Livestock farms

Participation in AGR-Lite consistently reduced absolute variability for all farms and farms with claims. Relative risk, measure by CV, for the most part declined under all farms and farms with claims. However, relative risk actually increased under AFARI for NFI for all livestock but not other categories. Similar results were found in average minimum with consistent increases with participation in AGR-Lite. The magnitude of change, observed in risk statistics, increased for farms with claims relative to all farms, which is expected.

4.3.3 Beef Farms

AFPF all farms

Table 4.22 presents results from 64 beef farms assuming AFPF. The associated cost of AGR-Lite, including only farms paying premiums, averaged $6,773 with a $27,182 maximum (Table 4.64). Initial mean AGRC and NFI were $185,560 and

$47,284 with respective ranges of $21,555 to $980,749 and -$19,073 to $270,425. Average standard deviations for AGRC declined with participation in AGR-Lite on average $3,456. Conversely, average standard deviation reported a $343 increase, on average, for NFI. Through further investigation it appears as though participation in AGR-Lite does not necessarily impact the lowest income years. In fact it was found that high years are receiving claims which, intuitively, contradict the perceived notion of the insurance principle. Insurance acts as a mechanism to insulate individuals from severe economic loss. However, given the nature of AGR-Lite, generating claims in what appear to be more favorable years, is quite possible. Refer to Appendix F for an example illustrating an increase in standard deviation.

Despite a $343 increase, CV, measuring relative variability, actually revealed a reduction of 0.01 for NFI. This result also seems unlikely given the standard deviation increase and unchanged averages. It appears the magnitude of CV reductions from farms with reductions exceed the increases observed from farms with increases, ultimately resulting in a reduction in CV. These conflicting findings may also be attributed to the elimination of farms with negative CVs, which cannot be interpreted. Average minimums increased, on average, 8.81% for AGRC and 57.46% for NFI. Contradictory to expectations, average maximums increased, on average, $863 for NFI. It is expected that the presence of insurance should decrease the maximum observation due to the cost of insurance. Given increasing average maximums, which potentially create wider distributions, it is reasonable to conclude these shifts account for standard deviation increases.

Table 4.23 presents the summary by frequency of claim for 64 beef farms in SE Kansas. Fewer than 50% of the 64 farms received zero claims, leaving 33 farms to generate at least one indemnity over the seven year period. Average premiums for AFPF, AFAR, and AFARI corresponding to frequency of claim are summarized within the table. As claims became more frequent, average paid premiums under AFAR and AFARI deviate further relative to AFPF. Average liability for the 64 farms by frequency of claim actually reveals an increase as opposed to the decrease seen in all farms, crop farms, and loosely in livestock farms. For the most part mean variability increases the higher the frequency of claim. Average indemnity per farm per year for frequencies 1 through 5 respectively were $39,941, $11,460, $21,067, $7,574, and $26,176.

AFPF farms with claims

Upon elimination of farms with zero claims, 33 farms remained with mean AGRC and NFI of $161,763 and $46,276 (Table 4.24). Under an AFPF, paid premiums reported a minimum and maximum of $163 and $27,182 with a mean of $6,773 (Table 4.64). For 33 farms, the average reduction in standard deviation nearly doubled for AGRC and NFI. Consequently the increase for NFI climbed to $665. Here again, CV reports conflicting results as both AGRC and NFI sustain reductions in relative risk. Participation in AGR-Lite increased average minimums $19,728 and $3,308 for AGRC and NFI respectively. Again, AFPF for farms with claims reports and average maximum increase of $1,635, almost double that for all farms.

AFAR all farms

Dividing total indemnities by total liabilities, a 3.1% rate was computed and applied to all farms (Table 4.64). As a result, 64 beef farms paid, on average, $3,493

with a $286 low and $21,486 high. As expected, the smallest AGRC average increased, from an initial $21,555 to $22,438, with participation in AGR-Lite, indicated in Table 4.25. Conversely the smallest NFI average declined from -$19,073 to -$20,029. Average standard deviation results coincide with those for AFPF with AGRC observing a $3,512 reduction while NFI sustained a $323 increase. AGRC, on average, increased the average minimum $10,207, slightly higher than AFPF with participation in AGR-Lite. While NFI increased its minimum average, the magnitude of change was slightly less compared to AFPF at $1,698.

AFAR farms with claims

Results from analysis of farms with claims, for AFAR, are presented in Table 4.26. Interestingly, mean premium paid declined to $3,444, illustrated in Table 4.64, with a minimum of $401 and maximum of $13,060. This suggests farms with lower liability were more likely to generate claims. Initial mean AGRC and NFI are consistent with those from AFPF. However, with an applied rate computed from all farms, these averages increased $3,329; a 2% and 7% increase in mean AGRC and NFI. Changes to absolute variability closely resemble those for AFPF. Average absolute variability declined $6,744 for AGRC while NFI increased average variability to $655, $10 less compared to AFPF. Although average absolute variability increased for NFI, relative variability declined 0.35. Average minimum increases surpassed those for AFPF with increases of $23,089 and $6,619 for AGRC and NFI. Although a $6,619 increase appears consistent with previous findings, when considering an initial average minimum of -$863, the resulting increase corresponded to a 788% increase. As has been the case in

previous scenarios, average maximum increased, on average, $4,909, three times that for AFPF.

AFARI all farms

Results corresponding to use of AFARI computed using only farms with indemnities are summarized in Table 4.27. With an average rate of 6.01% (Table 4.64), mean paid premium was $6,869 with a range of $562 to $42,257. Assuming every farm participated in AGR-Lite, mean AGRC and NFI declined $3,376. Results do reveal a reduction in average standard deviation for AGRC of $3,562, the largest compared to AFPF and AFAR. Alternatively, average standard deviation increased $309, which compared to AFPF and AFAR was lowest. These results are echoed by CV statistics, which reveal a 0.03 reduction for AGRC and 0.66 increase for NFI. Average minimum for AGRC increased $6,864, which was third compared to AFPF and AFAR. AGR-Lite generated a reduction in average minimum of $1,693, suggesting the product may not effectively cover low income years.

AFARI farms with claims

Results from 33 beef farms using AFARI are summarized in Table 4.28. Average paid premiums ranged from $789 to $25,686 with a mean of $6,773 (Table 4.64). Pre and post AGR-Lite means for AGRC and NFI match those for AFPF. With the applied rate (6.01%), beef farms generated the greatest reduction in average standard deviation ($6,780) compared to AFPF and AFAR. Similarly, with observed increases across categories, average standard deviation was minimized for NFI, relative to AFPF and AFAR, at $651. Interestingly, from a relative variability standpoint, NFI sustained a 0.19

average reduction. Average minimums for AGRC and NFI declined $19,790 and $3,262 respectively which were second and third highest compared to AFAR and AFPF.

Summary of Beef farms

Interestingly, participation in AGR-Lite increased average standard deviation consistently for all farms and farms with claims for NFI. However average percentage increases were minimal at 0.85% and 2% for all farms and farms with claims. Despite increases in absolute variability relative risk declined for all farms and farms with claims for AFPF, AFAR, and AFARI farms with claims. AFARI yielded increases to relative risk for all farms. Average minimum increased for all farms and farms with claims, except with use of AFARI for all farms, to which it decreased.

4.3.4 Dairy Farms

AFPF all farms

In total, 13 dairy farms were analyzed assuming AFPF with an average paid premium of $4,926 (Table 4.64). These farms tallied the largest mean AGRC and NFI across categories at $337,798 and $80,406, revealed in Table 4.29. As expected post AGR-Lite means remain unchanged from initial levels assuming AFPF. Both AGRC and NFI benefited from AGR-Lite with average standard deviation reductions of $1,881 and $977. Interestingly these reductions corresponded to near negligible changes in average relative variability. Average minimums for AGRC and NFI with participation in AGR-Lite generated expected results with increases of $6,665 and $2,884.

Of the 13 dairy farms four received at least one indemnity over the seven year period, leaving the remaining nine (almost 70%) receiving zero claims (Table 4.30). Average premium rates do reveal an increase with increasing frequency of claims.

However, transition from a frequency of two to three reveals a decrease from 7.14% to 2.34%. Although this is inconsistent with previous findings, it could be attributed to such a small sample size. When comparing average paid premium assuming AFAR and AFARI, frequency two, marked the smallest relative to AFPF. Furthermore, these results are validated by frequency two reporting the lowest average liability, which in most cases was half of others liability. Average indemnity per farm per year for frequencies one through three respectively were $31,446, $24,461, and $8,702.

AFPF farms with claims

Removal of farms with zero claims, four farms remained for analysis. Summary results for four dairy farms are presented in Table 4.31. Mean AGRC and NFI increased to $393,455 and $120,976. Again given the use of AFPF with AGR-Lite means remain unchanged. On average, with AGR-Lite, average standard deviations declined $6,112 and $3,174 for AGRC and NFI. Accordingly CV results indicate a slight reduction in relative variability of AGRC however; NFI actually reported a slight increase. Average minimums received increased for AGRC and NFI, $21,662 and $9,374.

AFAR all farms

Dividing total indemnities by total liabilities a 0.7% rate was computed and applied to each farm (Table 4.64). As a result the average premium paid ranged from a $457 low to a $5,303 high with a $1,516 mean. AGR-Lite contributed to a reduction in average standard deviation for both AGRC and NFI with respective reductions of $1,874 and $961 (Table 4.32). Similar to AFPF a slight reduction in relative variability was observed for AGRC, whereas relative variability actually increased 0.05 for NFI.

Average minimums were increased with AGR-Lite $6,660 and $2,834 which are comparable to AFPF.

AFAR farms with claims

With an applied rate of 0.7% and eliminating farms with zero claims, summary results for the remaining farms are presented in Table 4.33. With a questionably low rate mean AGRC and NFI increased $3,089 with participation in AGR-Lite. Average standard deviations declined two fold, $6,091 and $3,134 for AGRC and NFI. Yet again, CV reveals conflicting results for NFI indicating an increase in relative variability despite a reduction in absolute variability. Finally, AGR-Lite reduced average minimums $24,762 and $12,388 which exceed those from AFPF.

AFARI all farms

Computing a rate to reflect farms with claims resulted in a value 2.5 times larger than that for AFAR at 1.9% (Table 4.64). The average paid premium was $4,064 with a $1,224 to $14,219 range. Applying the higher rate mean AGRC and NFI declined $2,548 (Table 4.34). Average standard deviations declined for AGRC and NFI, on average, $1,864 and $933. Relative variability reveals a slight decline for AGRC and slight increase for NFI. Average minimum increases fell sharply compared to AFPF and AFAR with increases of $4,102 and $202 for AGRC and NFI.

AFARI farms with claims

With an applied average rate of 1.9%, the following results reflect four dairy farms with claims. Results are summarized in Table 4.35. Average paid premium was $4,926 with a $1,224 low and $14,219 high (Table 4.64). Mean AGRC and NFI remained unchanged, which with a rate linked directly to farms with claims makes sense.

Participation in AGR-Lite reduced average standard deviation for AGRC and NFI $6,057 and $3,067, the lowest compared to AFPF and AFAR. Comparison of relative variability reveals similar findings. There is a slight reduction in relative variability for AGRC however NFI reported a slight increase. Average minimum increased $21,692 and $9,174 for AGRC and NFI, which ranked second and third to AFPF and AFAR.

Summary of Dairy farms

For all farms and farms with claims, participation in AGR-Lite reduced standard deviation for NFI. Relative risk, under NFI, was reduced for all farms and farms with claims, however increased under AFARI. Participation in AGR-Lite generated consistent increases to average minimum across all scenarios.

4.4 Value of Farm Production (VFP) Results

Crop farms were selected for further analysis by farm size. These farms were categorized using VFP levels less than $100,000, $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000. Each subset was analyzed assuming AFPF, AFAR, and AFARI with and without farms with indemnities. Corresponding results are presented in subsequent sections.

4.4.1 VFP less than $100,000

AFPF all farms

There were 33 farms with an average VFP of $71,407. Including only farms which paid premiums, the average cost was $5,393 with a $19,974 maximum (Table 4.65). Initial mean AGRC and NFI were $54,210 and $8,508 (Table 4.36). Average standard deviations declined, as a result of participation in AGR-Lite, $3,648 and $930. Additionally, relative risk, measured by CV, declined 0.09 and 0.04 respectively. The

range in relative risk shrunk for AGRC from an initial 0.14 to 1.41 to 0.09 to 1.11 suggesting AGR-Lite was effective in risk reduction. However, NFI reduced the minimum CV to 0.50 from an initial 0.54 with the maximum remaining unchanged. Average minimum increased for both AGRC and NFI, on average, $5,773 and $1,266.

Table 4.37 presents the summary by frequency of claim for 33 crop farms. Of the 33 farms, seven generated zero claims indicating nearly 79% (26) of farms received a minimum of one indemnity over the seven year period. Dissimilar from previous categories of farm type average liability exhibits a slight increase with increasing frequency of claim. Consistent with previous findings, variability in liability increases as claims increase in frequency. Average indemnity per farm per year for frequencies 1 through 6 were $9,036, $14,608, $12,171, $10,600, $18,344, and $14,910 respectively.

AFPF farms with claims

Eliminating farms with zero claims, Table 4.38 presents the findings for farms with claims. Initial mean AGRC and NFI declined from all farms to $48,320 and $7,624. Reductions in average standard deviation increased in comparison to all farms to $4,630 and $1,180. So too did the reductions in relative risk, with average reductions for AGRC and NFI of 0.11 and 0.06. As a result of AGR-Lite participation, average minimums increased $7,327 and $1,606 for AGRC and NFI respectively.

AFAR all farms

Computing an AFAR of 11.04%, the 33 farms paid, on average, $4,249 with a range of $1,158 to $8,110 (Table 4.65). Initial average AGRC and NFI were consistent with those from AFPF at $54,210 and $8,508 (Table 4.39). The range in minimum average was reduced, resulting from participation in AGR-Lite program. AGRC and NFI

increased the lowest average to $19,875 and -$8,176 from initial levels of $15,560 and -$10,968 respectively. Compared to AFPF, average reductions in standard deviation were higher at $3,710 and $977. The average reduction in relative risk was similar for AGRC compared to AFPF, however farms with positive CV for NFI actually reported an increase from 1.15 to 2.37. It is important to note that 11 farms were excluded due to negative CV. Average minimum increases faired better compared to AFPF, with average increases of $6,058 and $1,418.

AFAR farms with claims

Excluding farms with zero claims and continuing with an AFAR of 11.04%, Table 4.40 summarizes the findings. As such, the remaining farms paid $4,272, on average, ranging from $1,158 to $8,110 (Table 4.65). Results from an 11.04% rate reveal an increase in average AGRC and NFI of $1,121. Average standard deviations declined from participation in AGR-Lite, on average, $4,671 and $1,225 or $41 and $45 higher respectively compared to AFPF reductions. Average reductions to relative risk were slightly higher in comparison to AFPF. Interestingly, under AFAR, relative risk increased 1.44, whereas declined under AFPF. These findings can be attributed to farms with less frequent claims which comparatively pay a relatively small AFPF to AFAR. Using AFAR does not take into consideration frequencies of claims by farm, and as such farms that paid a relatively small premium under AFPF are paying considerably higher premiums under AFAR (11.04%). Thus the rather small indemnities are offset by higher premiums, resulting in greater absolute variability, ultimately leading to heightened relative risk for AFAR compared to AFPF. Average minimums increased for AGRC and NFI $8,769 and $2,863, a larger increase compared to AFPF.

AFARI all farms

The final rate, AFARI, resulted in 13.93% rate which generated an average paid premium of $5,364 (Table 4.65) with a $1,461 to $10,238 range. With initial average AGRC and NFI equivalent to previous scenarios, the 13.93% applied rate resulted in a $1,115 decline from initial levels (Table 4.41). Under AFARI, farms generated the largest standard deviation reduction, compared to AFPF and AFAR, for AGRC and NFI, $3,721 and $983 respectively. Consistent with previous findings, reduction to relative risk was virtually equivalent for AGRC. Between AFPF, AFAR, and AFARI, AFPF generated the only relative risk reduction for NFI. Comparing AFAR and AFARI for NFI, AFARI marked the smaller increase of the two (0.44). Ranking average minimum increase reveals AFARI as second to AFAR with an average increase of $5,011 and $340 for AGRC and NFI.

AFARI farms with claims

Eliminating farms with zero claims, average paid premium increased to $5,393, indicated in Table 4.65. Initial average AGRC and NFI are equivalent to AFAR and AFPF. Under AFARI farms generated the largest benefit compared to AFPF and AFAR, with average standard deviation reductions of $4,675 and $1,229 (Table 4.42). With an average relative reduction of 0.12 and average increase of 0.33, AFARI ranked second to AFAR and AFPF respectively for AGRC and NFI. Similarly AFARI ranked second to AFAR for average minimum increase for AGRC and NFI.

Summary of VFP less than $100,000

Participation in AGR-Lite reduced initial standard deviation for all farms and farms with claims under all scenarios for NFI. Relative risk (CV) generally incurred

increases for AFAR and AFARI, however actually declined under AFPF. This is a direct result of farms with small AFPF paying a substantially higher premium under AFAR and AFARI, resulting in large CV increases. Average minimum exhibited consistent increases for all farms and farms with claims.

4.4.2 VFP $100,000 to $249,999

AFPF all farms

Of the 126 total crop farms, 49 fell within the VFP level of $100,000 to $249,999. These 49 farms reported an average VFP of $162, 533. Table 4.43 presents the results from these farms. Under AFPF, average paid premium was $7,963 (Table 4.65) with a $491 minimum and $23,424 maximum. Initial average AGRC and NFI were $130,301 and $31,381. With participation in AGR-Lite, average standard deviations declined $8,144 and $3,803. Computing relative risk reveals the initial CV values for AGRC exhibit considerably less variability than NFI with CVs of 0.35 and 2.54 respectively. However, NFI generated a larger relative reduction compared to AGRC, with averages of 0.22 and 0.07 respectively. Lastly, average minimum increased roughly 33% and 88%, or $21,713 and $8,339, for AGRC and NFI.

For 49 farms with VFP of $100,000 to $249,999, Table 4.44 presents the summary by frequency of claim. Upwards of 90% of the 49 farms generated a minimum of one indemnity over the seven year period. As expected average premium rates increase with increasing frequency of claim. Consistent with VFP of less than $100,000 and previous categories, variability of liability increases as claims become more frequent. Average indemnity per farm per year ranged from $18,731 to $30,646.

AFPF farms with claims

Five of the 49 farms had zero claims, thus 44 farms remained for analysis. Average paid premiums remained unchanged from AFPF all farms. Initial mean AGRC and NFI declined from all farms to $125,575 and $30,528. After eliminating farms with zero claims the reduction in average standard deviation was $9,069 and $4,235 (Table 4.45). Although NFI reported a smaller absolute change, relative risk, measured by CV, indicates a reduction three times that compared to AGRC. Average relative risk reductions were 0.08 and 0.24 for AGRC and NFI. The overall increase to average minimums increased compared to all farms, on average, $24,181 and $9,286.

AFAR all farms

Calculating an AFAR using 49 farms, the following results reflect farms with an AFAR of 8.13% (Table 4.46). On average, these 49 farms paid $7,151 with a $3,223 to $13,313 range (Table 4.65). Initial average AGRC and NFI were unchanged from AFPF. Comparing reductions in standard deviations, AGRC was less, while NFI was larger, to those for AFPF. CV statistics indicate an equivalent reduction for AGRC, compared to AFPF. NFI, however, reported an initial CV 0.8 less than that compared to AFPF. Furthermore, the reduction under AFPF was nearly three times that compared to AFAR. That being said, only 46 farms were included in generating NFI CV for AFAR, whereas 48 farms were used for AFPF. Average minimum increased for AGRC and NFI, $21,678 and $8,465. When measured against AFPF, the AGRC increase was less while NFI was greater.

AFAR farms with claims

Using only farms with claims (44), the average paid premium declined compared to all farms to $7,061 with an equivalent range, illustrated in Table 4.65. Using AFAR, average AGRC and NFI increased $902 (Table 4.47). Average standard deviation reductions were $8,808 and $4,258 which were second and first in comparison to AFPF. Here again, initial and post AGR-Lite relative risk for AGRC went unchanged compared to AFPF. Conversely, relative risk declined further for NFI compared to AFPF. Generating a larger increase than AFPF, average minimum increased $25,014 and $10,322 for AGRC and NFI.

AFARI all farms

Computing AFARI resulted in a 9.17% rate (Table 4.65), in turn costing farms on average $8,065 with a $3,635 to $15,014 range for AGR-Lite. Applying a rate computed using farms with claims, to all farms, resulted in a $914 decrease in average AGRC and NFI (Table 4.48). Application of AFARI resulted in a similar reduction to standard deviation compared to AFAR by larger when in comparison to AFPF. Conversely, the higher rate resulted in the lowest standard deviation reduction comparatively for AGRC. CV statistics indicate a 0.07 reduction to AGRC however a 0.47 increase to NFI. Average minimum increased $20,747 and $7,567 which ranked last for AGRC and NFI in comparison to AFPF and AFAR.

AFARI farms with claims

For the 44 farms with claims, initial average AGRC and NFI were $125,575 and $30,528 (Table 4.49). Using a rate based solely on farms with claims and assuing participation in AGR-Lite, average standard deviation declined $8,773 and $4,258 for

AGRC and NFI. The reduction for AGRC ranked third to AFPF and AFAR whereas, the reduction for NFI was equivalent to that for AFAR, both of which were higher than AFPF. Reductions to relative risk were constant for AGRC compared to AFPF and AFAR. Inconsistent with AFPF and AFAR, AFARI generated an increase of 0.05 in relative risk. Increases in average minimum ranked third and second respectively behind AFAR and AFPF for AGRC and NFI.

Summary of VFP $100,000 to $249,999

Absolute variability, in NFI, declined with participation in AGR-Lite consistently across all scenarios for all farms and farms with claims. Relative risk declined, for the most part, under all farms and farms with claims. However application of AFARI yielded increases in relative risk for all farms and farms with claims. This result is explained by AFPF and AFAR resulting in more farms generating larger reductions compared to AFARI, attributed to increased premiums. Average minimum generated consistent increases, across premium scenarios, for all farms and farms with claims. Impacts from AGR-Lite tend to be greater for farms with claims compared to all farms.

4.4.3 VFP $250,000 to $500,000

AFPF all farms

There were 38 farms with VFP of $250,000 to $500,000. These 38 farms reported an average VFP of $328,798. Using AFPF, average paid premium was $11,937 (Table 4.65) with a $53 to $41,508 range. Initial average AGRC and NFI were $291,674 and $73,546 (Table 4.50). AGR-Lite reduced average standard deviation $12,582 and $8,069 respectively for AGRC and NFI. Initial average relative risk for AGRC and NFI

were 0.37 and 1.36. With AGR-Lite these values declined 0.04 and 0.18. Average minimums increased, as a result of AGR-Lite, $29,221 and $18,714.

With 87% of farms receiving a minimum of one indemnity over the seven year period, Table 4.51 presents the summary by frequency of claim. Consistent with previous findings, average premium rate increases with greater frequency of claims. These 38 farms exhibit a definitive increase in average liability as frequencies increase. Additionally standard deviation of liability increases as claims become more frequent. Average indemnity per farm per year ranged from $36,820 to $66,516.

AFPF farms with claims

Of the 38 farms, 33 farms remained receiving at least one indemnity over the seven year period. Average AGRC increased, relative to all farms, to $292,904 while NFI declined to $73,115 (Table 4.52). By eliminating farms with zero claims, average reduction in standard deviation increased to $14,489 and $9,929 for AGRC and NFI respectively. Reductions in relative variability were comparable to all farms with slight increases. Along with that, average increases in average minimum were higher for farms with claims at $33,649 and $21,550.

AFAR all farms

Computing an AFAR of 5.81%, the following reflects the results from 38 farms with the applied rate (Table 4.53). Average paid premium, resulting from an AFAR, was $10,367 (Table 4.65). Initial average AGRC and NFI were equivalent to those for AFPF at $291,674 and $73,546. Perhaps most interesting was the increase in minimum average, for NFI, with an initial observation of -$140 to a post value of $13,297 which equates to a 9,569% increase. Average standard deviation declined $12,493 and $8,135,

which compared to AFPF were less than and greater than AGRC and NFI respectively. Reduction in relative risk went unchanged from AFPF results, whereas AFAR generated a larger reduction of 0.26. Comparison of average minimum increase reveals a greater increase for AGRC and NFI relative to AFPF results.

AFAR farms with claims

Continuing to apply AFAR, including only farms with claims reveals a $1,198 increase in average AGRC and NFI, illustrated in Table 4.54. The average paid premium for these farms increased to $10,739 (Table 4.65). Average reductions in average standard deviation ranked second overall compared with AFPF and AFAR for AGRC and NFI, on average $14,315 and $9,327. Similar to previous findings, relative risk reductions for AGRC were constant across AFPF, AFAR, and AFARI. NFI, conversely, reported the largest reduction compared to AFPF and AFARI, at 0.37. Lastly, AFAR marked the largest increase in average minimum for AGRC and NFI at $35,334 and $23,211.

AFARI all farms

Resulting from a computed AFARI of 6.45%, average AGRC and NFI declined $1,157 (Table 4.55). Overall, paid premiums averaged $11,523, illustrated in Table 4.65. With average standard deviation reductions of $12,482 and $8,141 for AGRC and NFI, these values marked the third and first highest reductions respectively. Again, average reductions in relative variability were nearly equal for AGRC while NFI marked the second highest reduction behind AFAR. Reporting the smallest increase in minimums compared to AFPF and AFAR, AGRC and NFI increased minimums, on average, $28,654 and $18,111.

AFARI farms with claims

Removal of farms with zero claims increased the average premium cost to $11,937 (Table 4.65). Initial average AGRC and NFI were equivalent to those for AFPF (Table 4.56). With AGR-Lite, 33 farms benefited with average standard deviation reductions of $14,294 and $9,330. CV reveals the second largest reduction for NFI (0.34) behind AFAR. Imposing AGR-Lite average minimum increased $34,190 and $22,058 which ranked second to AFAR.

Summary of VFP $250,000 to $500,000

Participation in AGR-Lite reduced absolute variability and relative risk for all farms and farms with claims with VFP of $249,999 to $500,000. Additionally, insuring with AGR-Lite increased average minimums for all farms and farms with at least one claim.

4.4.4 VFP greater than $500,000

AFPF all farms

There were 6 farms with VFP of greater than $500,000 (Table 4.57). The average VFP for these 6 farms was $877,723. Using AFPF, the average paid premium, for the 6 farms, was $16,910 (Table 4.65) with a $5,967 to $27,677 range. Initial and post AGRC and NFI were $831,791 and $197,236. With participation in AGR-Lite, absolute variability measured by standard deviation, declined $16,130 and $14,473. Relative variability declined for AGRC and NFI, however rather minimal at 0.02 and 0.08 respectively. Assuming participation in AGR-Lite average minimum increased $55,214 and $27,966.

Table 4.58 presents the summary by frequency for 6 farms. Four of six farms generated a minimum of one claim over the seven year period. As expected average premium rate increases as claims become more frequent. Use of AFARI resulted in premiums which corresponded closely with AFPF. Consistent with previous analysis, average liability declines with increasing frequency of claims. Unique from previous results is the decline in mean standard deviation of liability as claims become more frequent. Finally, average indemnity per farm per year respectively for frequencies 1 through 3 were $117,717, $71,165, and $31,905.

AFPF farms with claims

Eliminating farms with claims, four farms remained for analysis. Table 4.59 summarizes the results with use of AFPF on four farms. Initial mean AGRC and NFI declined from all farms to $775,482 and $167,011. As expected, omitting farms with zero claims increased the impact of participation in AGR-Lite on average standard deviation. Respective reductions in standard deviation for AGRC and NFI were $24,194 and $21,710. Additionally, reductions to relative risk were reduced further to 0.03 and 0.12 with participation in AGR-Lite. Similarly average minimum increased for AGRC and NFI, $82,820 and $41,948, corresponding to a 25% and 55% increase.

AFAR all farms

Dividing total indemnities by total liabilities resulted in an AFAR of 2.52%. As such, those six farms paid, on average, $11,273 with a $7,214 to $18,453 range (Table 4.65). Initial average AGRC and NFI correspond to those for AFPF (Table 4.60). Reductions to standard deviation, assuming participation in AGR-Lite were $16,409 and $14,863, both of which exceed those compared to AFPF. Reductions to relative risk

were similar in comparison to AFPF, with reductions of 0.02 and 0.08. Compared to AFPF, increases in average minimum were larger at $55,872 and $29,216.

AFAR farms with claims

Analyses of farms (4) with claims are presented in Table 4.61 assuming AFAR. Following elimination of farms with zero claims average paid premium declined to $10,612 (Table 4.65) with a $7,214 to $13,322 range. As a result, average AGRC and NFI increased $6,298. Average reductions were larger under AFAR, compared to AFPF, at $24,411 and $22,002. Reductions to relative risk were comparable to AFPF. Average minimum, on the other hand, increased compared to AFPF, with averages of $89,730 and $49,076.

AFARI all farms

Calculating an AFARI of 4.01%, using only farms with claims, Table 4.62 presents the results for 6 farms with the applied AFARI. Table 4.65 presents the average paid premium by all 6 farms corresponding to AFARI. Use of AFARI resulted in a mean paid premium of $17,964 with an $11,495 to $29,405 range. Consistent with previous findings, due to application of an overstated rate, average AGRC and NFI declined $6,691. Average reduction in standard deviation ranked highest relative to AFPF and AFAR with $16,574 and $15,091 declines for AGRC and NFI. Results from relative risk were comparable for AGRC however, reductions for NFI were lowest in comparison to AFPF and AFAR. Lastly, AFARI generated the smallest average minimum increase, in comparison to AFAR and AFPF, with increases of $49,564 and $23,267.

AFARI farms with claims

Consistent with AFPF and AFAR, initial mean AGRC and NFI were $775,482 and $167,011 (Table 4.63). Eliminating farms with zero claims, 4 farms remained for analysis with AFARI. With an AFARI of 4.01%, indicated in Table 4.65, average paid premium, across farms, was $16,910 with a range from $11,495 to $21,229. Here again, assuming participation in AGR-Lite, use of AFARI resulted in a larger benefit in average standard deviation reduction compared to AFPF and AFAR, with reductions of $24,539 and $22,174. As for relative risk, reductions for AGRC were comparable to AFPF and AFAR, while the reduction under NFI was the smallest compared to AFPF and AFAR. Average minimum increased $83,783 and $43,271 for AGRC and NFI, which in comparison ranked second to AFAR but higher than AFPF.

Summary of VFP greater than $500,000

Overall participation in AGR-Lite consistently reduced standard deviation and relative risk for NFI. Furthermore, AGR-Lite increased average minimums for all farms and farms with claims.

4.5 Summary results by farm category and VFP

Table 4.64 and Table 4.65 present a combined summary of results by farm type and VFP category. As Table 4.64 reveals crop farms consistently reported higher values for; average AFPF, AFAR, average AFAR premium, AFARI, average AFARI premium, percent of farms with claims, average indemnity, and frequency of claims in comparison to the other four categories. However crop farms reported the second smallest liability, behind beef. Comparatively, dairy farms registered the smallest values for every category with the exception of average liability, for which it ranked highest overall.

Table 4.65 reports the summary statistics for four VFP categories. Average AFPF and average premiums corresponding to AFAR and AFARI increase as VFP levels increase which are expected as size (liability) increases. Interestingly VFP of less than $100,000 generated the largest AFAR (11.04%) and AFARI (13.93%) followed by VFP of $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000. This indicates that smaller farms, measured by VFP, generated claims more frequently, relative to larger farms. Intuitively this makes sense as smaller farms are more concentrated in nature thus any economic misfortune will lead to severe losses. The percent of farms which received claims was largest for VFP of $100,000 to $249,999, followed by VFP of $250,000 to $500,000, less than $100,000, and greater than $500,000. Frequency of claims ranks VFP category of less than $100,000 highest followed by VFP categories of $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000.

4.6 Certainty Equivalent (CE) analysis

The following sections present CE results under AFPF, AFAR, and AFARI. Each section provides discussion for each category (total, crop, livestock, beef, and dairy). Additionally CE results are discussed for VFP categories (less than $100,000, $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000). For each scenario results are presented including all farms from each category and then farms which yielded a minimum of one claim over the seven years. Using AGRC, CE results were computed assuming a logarithmic utility function. Due to high premium costs and inventory adjustments negative values of AGRC were encountered which for a logarithmic utility function are problematic. Realizing this, analysis proceeded by excluding farms with

negative values. As such, farm numbers discussed below may not coincide with those previously presented.

Certainty equivalents provide a monetary proxy for what a decision maker would be willing to accept to forgo some risky alternative. For this analysis CEs revealed the level of income a decision maker would be willing to accept in lieu of the observed variability in income spanning the seven year period. It is expected that as variability declines CE will increase and vice versa. Therefore we would expect CEs with AGR-Lite to be larger than those without AGR-Lite.

4.6.1 Total Results

AFPF all farms

For the five categories, total, crop, livestock, beef, and dairy Table 4.66 presents the results assuming AFPF for all farms. Initial mean CEs for the five categories were $194,095, $179,414, $214,262, $182,416, and $331,784 for total, crop, livestock, beef, and dairy. Application of AFPF resulted in each of the five categories yielding a positive change in CE suggesting AGR-Lite reduced the initial seven year variability thus proving beneficial to producers. Ranking of the five categories based on change as a percent of initial AGRC reveals crop farms as highest followed by total, livestock, beef, and dairy. This suggests that participation in AGR-Lite yielded the greatest benefit to crop farms and the least to dairy. This is expected considering the frequency of claims generated by crop farms relative to dairy farms. Respective CE changes (including only farms with changes) according to the above ranking were $5,400, $4,769, $3,129, $2,962, and $1,674. Of the five categories dairy farms were the only group not to generate a negative

change in CE. Percent of farms with positive CE change ranged from 31 to 83. Crop farms marked the top slot followed by total, beef, livestock, and dairy.

AFPF farms with claims

After excluding farms with zero claims, the following number of farms remained from each farm category, 150, 106, 44, 31, and 4 for total, crop, livestock, beef, and dairy, located in Table 4.66. Again theses numbers may not reflect those presented in previous analysis due to exclusion of farms with negative observations. Mean CEs for farms with claims for each category were $172,475, $169,377, $179,938, $160,293, and $381,702. Changes in CE were the same as those for all farms as the CE changes only reflect farms with increased CE. Farm category dairy was the only group to increase the minimum CE change across categories. We would expect that by eliminating farms with zero claims results would reveal zero farms with decreased CE. Results were generated which calculated the percent of farms with positive changes. With participation in AGR-Lite farm category dairy reported 100% of farms with increases followed by crop, total, livestock, and beef at 98%, 97%, 95%, and 94% respectively. These findings are somewhat unexpected considering these include indemnities and premiums by farm. There are two possible explanations. In most scenarios farms reduced standard deviation with participation in AGR-Lite. However, the farm with reduced CE yielded an increase in standard deviation. A second reason is that, in general, farms increased minimums and reduced maximums with participation AGR-Lite. However a few farms resulted in minimum reductions in AGRC. In the case for reduced CE the reduction to the maximum exceed that in comparison to the reduction in minimum. As such, even with reduced absolute variability, a smaller distribution range resulted in a CE reduction.

AFAR all farms

Using an AFAR calculated by dividing total indemnities by total liabilities for each category, CE changes shrunk relative to AFPF. Table 4.67 presents the results assuming AFAR. Consistent with AFPF results, each category generated increases in CE with crop farms ranking highest with a $4,428 increase. Conversely dairy farms recorded the smallest benefit from participation in AGR-Lite at $525. The CE changes across the five categories ranged from -$41,624 to $75,050. Percent of farms with positive change declined relative to AFPF, with the exception of dairy which remained at 31%.

AFAR farms with claims

After eliminating farms with zero claims, the remaining subset consistently yielded greater increases compared to AFPF farms with claims, assuming AFAR (Table 4.67). Ordinal ranking of farms based on absolute change places total as number one followed by crop, livestock, beef, and dairy. However rankings are altered when compared to those computed as a percent of initial mean AGRC. On percentage terms farm categories were aligned as follows; total, crop, beef, livestock, and dairy. Compared to AFPF, percent of farms with positive change declined with each category, excluding dairy which maintained a 100% positive rate. Percentage changes declined drastically for total and crops, each at 69% of farms, whereas livestock and beef dropped to 80% and 74% respectively.

AFARI all farms

The final analysis across categories reflects CEs calculated assuming AFARI, which only uses farms who received at least one claim over the seven year period. Table 4.68 presents category specific farm numbers, rates, CE, and CE changes. With a higher

applied rate three of the five categories averaged negative CE changes. These categories include livestock, beef, and dairy. Categories total and crop reported CE increases of $104 and $2,914. CE changes for all categories ranged from -$49,665 to $64,290. Applying AFARI, percent of farms with positive change, benefiting producers, declined even further, relative to AFPF and AFAR.

AFARI farms with claims

Results for farms with claims assuming AFARI, calculated using farms with claims are presented on the lower half of Table 4.68. Ordinal ranking of categories based on the magnitude of CE change places crop at the top with an average increase of $5,207. Interestingly, change as a percent of initial mean AGRC reveals category total reaped the largest benefit with an average CE change of $4,464, second to crop. For farms with claims the range in CE changes spanned from -$40,480 to $64,290. Farm percentages were computed to indicate the percent of farms with increased CEs. Dairy farms with claims reported 75% with positive increases. The remaining categories reported 61%, 59%, 52%, and 48% with increases for crop, total, beef, and livestock. These values were lower in comparison to AFPF and AFAR.

Summary for total CE results

Overall participation in AGR-Lite increased CE indicating the product to be beneficial to producers through a reduction in variability over the seven years. With the exception of application of AFARI for all farms, AGR-Lite increased CE for all farms and farms with claims. Even so, crop farms and total farms increased CE, while livestock, beef, and dairy declined under AFARI for all farms. As expected the percent of farms with increased CE increased for farms with claims in comparison to all farms.

4.6.2 Value of Farm Production Results – Crop Farms

AFPF all farms

For the four VFP categories from smallest to largest initial CE means, without AGR-Lite, for the respective categories were $51,204, $121,088, $270,331, and $763,724 (Table 4.69). As the table indicates, and as expected, using AFPF resulted in zero change to mean AGRC. However, results reveal participation in AGR-Lite increased mean CE with changes ranging from $1,964 to $20,992. This indicates that the presence of AGR-Lite reduced the variability within the seven year distribution, leading to CE increases. To establish ordinal ranking of categories, average changes can be divided by initial AGRC. As such, VFP of $100,000 to $249,999 resulted in the largest change, followed by VFP of less than $100,000, greater than $500,000, and $250,000 to $500,000. However, VFP of $250,000 to $500,000 reported the largest percent of farms with a positive change at 87%. The smallest percent (67) resided in VFP category of greater than $500,000.

AFPF farms with claims

For VFP categories from smallest to largest 25, 44, 33, and 4 farms remained generating at least one claim. Results for these farms are located at the bottom of Table 4.69. Initial mean CE dropped for each VFP category averaging $45,445, $115,949, $270,152, and 700,254. With application of AFPF mean AGRC remain unchanged. CE changes go unchanged from all farms because CE change was calculated using only farms with increased CE. To compare CE changes were divided by initial AGRC. As a percent of initial mean AGRC, VFP of less than $100,000 generated the greatest benefit to farms followed by VFP of $100,000 to $249,999, greater than $500,000, and $250,000

to $500,000 respectively. Percent of farms with positive changes increased considerably with three of the four categories achieving 100%. The only category not attaining 100% was VFP of $100,000 to $249,999 with 95%. Further examination reveals the two farms with reduced CEs showed increases in standard deviation.

AFAR all farms

Results by category under AFAR all farms are reported at the top portion of Table 4.70. Average premium rates by category were 11.04%, 8.13%, 5.81%, and 2.52% from smallest to largest VFP categories. Initial CE averages by VFP category were $51,204, $121,088, $270,331, and $763,724. With participation in AGR-Lite average CE changes, for farms with increases, ranged from $1,033 to $14,445. To rank categories, average CE change as a percent of initial mean AGRC revealed VFP of $100,000 to $249,999 was highest followed by VFP of $250,000 to $500,000, less than $100,000, and greater than $500,000. Using AFAR, percent of farms with positive changes fell for each category, in comparison to AFPF, ranging from 44% to 59%. Using AFPF, participation in AGR-Lite cost nothing to farms with zero claims thus their corresponding distributions remain unaffected. However using AFAR, farms with zero claims incur the cost of insurance which is reflected in a reduced income distribution, by the cost of insurance.

AFAR farms with claims

The lower half of Table 4.70 presents the results for farms with claims assuming application of AFAR. Initial CEs declined from all farms, averaging $45,445, $115,949, $270,152, and $700,254 from smallest to highest VFP categories. CE average changes across the four categories increased from all farms with a $2,537 to $28,225 range. Converting CE changes to a percent of initial AGRC reveals VFP of less than $100,000

as the highest followed by VFP of $100,000 to $249,999, greater than $500,000, and $250,000 to $500,000. Comparing these results to those from AFPF reveal equivalent rankings. The percentage of farms with positive changes fell precipitously compared to AFPF with an overall range of 56% to 75%. VFP of less than $100,000 had the smallest (56%) while VFP of greater than $500,000 had the highest (75%).

AFARI all farms

Computing a rate which reflected only farms with claims, excluding farms with zero claims, resulted in the following rates, 13.93%, 9.17%, 6.45%, and 4.01%, for VFP categories of less than $100,000, $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000 (Table 4.71). Average change in CE was comparable to AFPF and AFAR. Of the four categories VFP of less than $100,000 was the only group to sustain a decline ($118). The remaining VFP categories reported an average increase ranging from $3,474 to $7,392. As a percent of initial AGRC, VFP of $100,000 to $249,999 ranked highest with VFP of $250,000 to $500,000 and greater than $500,000 following respectively. Comparing the percent of farms with positive changes indicates slight decreases for VFP of less than $100,000 and $250,000 to $500,000 to AFAR. However, VFP of $100,000 to $249,999 and greater than $500,000 resulted in an equivalent percentage increase (59% and 50%).

AFARI farms with claims

After elimination of farms with zero claims, the following results reflect CEs from farms with claims located in lower half of Table 4.71.Continuing with use of AFARI, initial average CE declined from all farms. By eliminating farms with zero claims, average CE changes were positive for every category ranging from $1,348 to

$21,543. As a percent of initial AGRC, VFP of $100,000 to $249,999 ranked first, followed by VFP of less than $100,000, greater than $500,000, and $250,000 to $500,000. The only difference in rankings compared to AFPF and AFAR, was the first and second slots, which interchanged for AFARI. Similar to findings for all farms, percent of farms with positive changes went unchanged for VFP of $100,000 to $249,999 and greater than $500,000, and declined for VFP of less than $100,000 and $250,000 to $500,000.

Summary of VFP CE results

Overall, participation in AGR-Lite increased CE for each VFP category indicating the presence of insurance reduced income variability over the seven years. It was only with application of AFARI that VFP of less than $100,000 reduced CE. As expected, percent of farms with increased CE rose when comparing all farms to only farms with claims. Additionally, as farm size increased CE change did as well.

4.7 Downside Risk

Another measure used to evaluate the effectiveness of AGR-Lite at risk reduction was Downside Risk (DR). DR informs a manager of the largest downside potential risk he/she could incur from a given alternative or strategy relative to some target income. This could also be thought of as safety first criterion which suggests a farm manager will evaluate a decision based on performance against the criterion. Using a Kansas average family living cost and the number of operators per farm and computing the product, a target return was determined and then subtracted from NFI. DR was calculated prior to and post participation in AGR-Lite. Section 4.7.1 presents the results for DR assuming AFAR and AFARI for all categories. Subsequently, section 4.7.2 presents DR results for

crop farms which were grouped into VFP categories. Additionally both scenarios will provide discussions and comparisons of results for all farms and then farms with claims (eliminating farms with zero claims).

DR was only examined under AFAR and AFARI because, unlike AFPF, these premium scenarios result in changes to minimum and maximum averages. With that said, AFPF would result in a zero change to DR and thus was not used for DR analysis.

4.7.1 Total Results

AFAR all farms

Table 4.72 presents the summary of DR by farm category assuming application of AFAR. Initial mean DRs by farm category were $11,964, $9,126, $15,810, $13,158, and $29,155 for total, crop, livestock, beef, and dairy respectively. These results indicate crops farms retained the greatest initial DR, evident by the lowest value. The overall range in DR change across farm categories was -$40,575 to $30,961. Given application of AFAR, on average, DR change was zero with participation in AGR-Lite. The bottom of Table 4.72 provides a summary by farm category of farms with increased and decreased DR. To clarify, increased DR, indicated by negative values, implies the farm was worse off as a result of the insurance product. Decreased DR, indicated by positive values, suggests the farm benefited from the insurance program. Towards the top of the table, minimum and maximum DR was included with and without participation in AGR-Lite to illustrate the range in DR by farm category. In the presence of AGR-Lite the minimum DR decreased for farm categories dairy, crop, and total. Individuals would expect to decrease DR with insurance. For example, farm category dairy increased the minimum from -$47,236 to -$44,627, with participation in AGR-Lite, meaning a DR

decrease. The crop farm category results reveal nearly 47% of farms with decreased DR, the largest across categories. For the 59 crop farms DR declined $6,402 indicating, on average, a farm increased their bottom dollar $6,402. Percent of farms with decreased DR ranged from 30.77% to 46.83%. Farm category dairy reported 4 farms (30%) with an average DR decrease of $3,089, the lowest across categories. Despite grabbing the largest benefit from AGR-Lite, 67 of the 126 crop farms, consequently, tallied the largest average increase in DR by $5,637. The largest percent (69) of farms with increased DR was farm category dairy. Although dairy had the highest percentage, these farms marked the lowest average increase across categories at $1,373.

AFAR farms with claims

Excluding farms with zero claims average DR across farm categories were $9,331, $6,995, $14,766, $13,584, and $50,827 for total, crop, livestock, beef, and dairy respectively, presented in Table 4.73. With participation in AGR-Lite average decreases to DR, beneficial to producers, were highest for livestock at $3,574 and lowest for crops at $1,419. Farms incurred DR decreases due to the elimination of farms with zero claims. By eliminating farms with zero claims, DR results are no longer influenced by farms with lowered distributions due only to premium costs. That said, including farms with zero claims increases the number of farms with increased DR. As a comparative measure calculating average DR change as a percent of initial DR, reveals total farms, which had the fourth highest decrease, actually reported the largest average percent decrease in DR followed by beef, livestock, crop, and dairy. Dairy was the only farm category to have reported 100% of farms with reductions in DR (benefiting producers) compared to other farm categories. Further analysis of farm categories by farms with increases and

decreases in DR as a percentage of initial downside risk reveal crop farms generated the greatest benefit followed by total, beef, livestock, and dairy. The number of farms with increased DR declined when eliminating farms with zero claims. This makes sense due to the elimination of farms that paid a premium but received no claim. In doing so, DR results are no longer influenced by farms with declining distributions due only to premium costs.

AFARI all farms

Using only farms which received at least one claim over the seven year period for every category, an AFARI was computed and applied to each farm category. With rates reflecting farms with claims each farm category (including all farms), on average, were worse off, meaning an increase in DR, as a result of participation in AGR-Lite. Average changes in DR ranged from -$1,438 to -$3,842. Examining DR changes as a percent of initial DR suggest beef farms were most negatively impacted, followed by livestock, total, crop, and dairy. Similar results were found when ordinal ranking of farm categories, based on average reductions to DR, were performed. Table 4.74, near the bottom, presents the average reduction in DR, computed using only farms with decreased DR. Across farm categories, average DR reductions ranged from $2,073 to $6,426. Computing the reductions as a percent of initial DR indicates category crop farms sustained the largest reduction comparatively followed by total, livestock, beef, and dairy. Additionally, just over 41% of crop farms (largest across categories) generated a reduction in DR.

AFARI farms with claims

Table 4.75 presents the summary DR results by farm category assuming an AFARI. A comparison of AFARI to AFAR results reveals slight differences. First, as expected from a higher applied rate, less farms reduced DR. Furthermore, farms with decreased DR incurred, on average, a smaller reduction in DR ranging from $2,073 to $6,426. Recall under AFAR, category dairy reported 100% of farms with decreased DR, followed by livestock, beef, total, and crop. While category dairy continued to report the highest percent of farms with decreased DR (75%), livestock and beef were interchanged, arranging themselves fifth and fourth behind crop and total at second and third. Ordinal ranking based on average decrease in DR, calculated as a percent of initial DR, placed crop first followed by total, livestock, beef, and dairy. When compared to AFAR, results are consistent with the exception of beef and livestock which ranked fourth and third respectively.

Summary of total DR results

Participation in AGR-Lite did reduce DR, benefiting producers, however the impact varies with premium application. Reductions to DR were higher under AFAR in comparison to AFARI. Increases in DR were also higher under AFARI relative to AFAR. This is a directly related to the higher associated premium costs resulting from a higher rate. Furthermore, percent of farms with increased DR, which negatively impact farms, declined when eliminating farms with zero claims. As such the results no longer include farms which paid a premium and received zero claims. Therefore there are no farms with lowered distributions attributed only to premium costs.

4.7.2 Value of Farm Production (VFP) – Crop farms

AFAR all farms

Table 4.76 presents the results for VFP categories assuming AFAR. Initial DR ranged from -$18,533 to $142,139. These results indicate VFP of less than $100,000 to bear the greatest DR followed by VFP of $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000. Use of AFAR on all farms resulted in a zero DR change, which is expected from an AFAR in which indemnities equal premiums. However, average decrease in DR, located near the bottom of the table, by category does establish a ranking. Due to variation in average DR, average reductions were computed as a percent of initial DR to establish rankings. These percentages reveal the following ranking from most to least preferred; VFP of $100,000 to $249,999, $250,000 to $500,000, less than $100,000, and greater than $500,000. The percent of farms with DR reductions ranged from 28.95% to 50%. It is apparent that a greater percent of farms increased DR, negatively impacting farms, with average increases ranging from -$3,052 to -$10,206.

AFAR farms with claims

Eliminating farms with zero claims results deviate from all farms as Table 4.77 illustrates. Initial DRs were -$18,498, -$5,648, $30,036, and $121,676 for VFP of less than $100,000, $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000. Using AFAR, average change in DR increased, indicating greater decreases in DR, for all categories as a result of participation in AGR-Lite. Average DR changes ranged from $902 to $6,298. This indicates that one farm category reduced DR, on average, $902, meaning they would be $902 better off with participation in AGR-Lite. Ordinal ranking, following computation of DR changes as a percent of initial DR, reveals VFP of

$100,000 to $249,999 to benefit the greatest followed by VFP of less than $100,000, greater than $500,000, and $250,000 to $500,000. Further analysis broke farms apart according to increases and decreases in DR. Three of the four VFP categories reported more than 50% of farms with decreased DR. Ranking of categories by decreased DR, as a percent of initial DR, coincides with those of AFAR all farms.

AFARI all farms

A second scenario calculated an AFARI which used only farms with claims. These results are summarized and presented in Table 4.78. Initial DR levels parallel those for AFAR all farms. Through application of AFARI, average change in DR were negative for all categories ranging from -$914 to -$6,691. This indicates that each VFP category increased DR which negatively impacted farms. Computing these changes as percent of initial DR reveals VFP of $100,000 to $249,999 as having the largest percentage DR increase, followed by VFP of less than $100,000, greater than $500,000, and $250,000 to $500,000. Although VFP of $100,000 to $249,999 had the largest percentage increase change in DR, when analyzing only farms with decreased DR as a percentage of initial DR, were comparatively the highest across categories. The percent of farms with decreased DR ranged from 33% to 50%, indicating a greater percent of farms increased DR with participation in AGR-Lite. This suggests AGR-Lite may not be effective in reducing DR.

AFARI farms with claims

Excluding farms with zero claims, Table 4.79 presents downside risk results assuming AFARI. Initial levels of DR are equivalent to those for AFAR farms with claims. Comparing rank of VFP categories by average decrease in DR as a percent of

initial DR reveals an exact match to AFAR. Different from AFAR is the percent of farms with decreased DR. VFP categories greater than $250,000 remained unchanged while VFP categories below $250,000 reduced the percent of farms with decreased DR. As such, the percent of farms with increased DR increased under AFARI, a direct result of increased premiums due to a higher premium rate.

Summary of VFP DR results

As expected, participation in AGR-Lite, in most instances, reduced DR. Consistent with previous findings results will vary with premium selection. Average decreases in DR were greater under AFAR in comparison to AFARI, due to lower associated premium costs. Increases to DR, negatively impacting farms, were larger under AFARI compared to AFAR which is expected due to increased premium costs. The percent of farms with decreased DR increased for farms with claims in comparison to all farms. These results are expected following the elimination of farms with zero claims with lowered distributions attributed to corresponding premium costs.

Table 4.1 Summary statistics for 219 SE Kansas farms assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$203,236	$203,236	$0	0.00%	$49,284	$49,284	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$19,073	-$19,073	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$64,803	$58,380	-$6,424	-9.91%	$41,280	$38,437	-$2,843	-6.89%
Minimum	$6,086	$2,931	-$57,563	-51.84%	$4,958	$3,075	-$62,315	-37.98%
Maximum	$529,292	$481,845	$17,617	-8.96%	$250,775	$240,432	$22,622	-4.12%
Average CV[1]	0.33	0.28	-0.05	-14.60%	1.63	1.53	-0.10	-6.00%
Minimum	0.06	0.06	-0.33	0.00%	0.19	0.19	-3.73	0.00%
Maximum	1.41	1.11	0.10	-21.35%	35.28	34.52	2.07	-2.18%
Average Minimum	$118,185	$134,517	$16,333	13.82%	-$6,631	$273	$6,904	104.12%
Minimum	-$24,742	-$1,888	-$13,416	92.37%	-$313,879	-$147,879	-$20,333	52.89%
Maximum	$783,502	$827,107	$166,000	5.57%	$218,015	$261,620	$166,000	20.00%
Average Maximum	$298,628	$293,665	-$4,962	-1.66%	$111,852	$109,276	-$2,576	-2.30%
Minimum	$25,147	$21,723	-$41,508	-13.62%	-$2,300	-$6,335	-$35,628	-175.44%
Maximum	$1,708,403	$1,680,736	$37,357	-1.62%	$719,861	$712,594	$84,436	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 202 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.2 Summary by frequency of claim for 219 SE Kansas farms assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	66	0.00%	$0	$6,375	$9,577	$140,336	$11,261	$0
1	60	3.34%	$4,810	$6,542	$9,828	$144,011	$11,753	$33,673
2	40	6.24%	$6,690	$4,874	$7,322	$107,292	$10,714	$23,414
3	30	9.38%	$10,894	$5,274	$7,923	$116,100	$14,633	$25,418
4	13	15.67%	$15,866	$4,599	$6,910	$101,246	$14,197	$27,766
5	7	23.18%	$16,332	$3,201	$4,809	$70,467	$19,401	$22,865
6	2	23.19%	$15,723	$3,080	$4,627	$67,798	$22,472	$18,343
7	1	30.52%	$23,156	$3,447	$5,178	$75,874	$14,621	$23,156

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (4.54%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (6.82%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.3 Summary statistics for 153 SE Kansas farms with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,736	$182,736	$0	0.00%	$46,247	$46,247	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$10,968	-$10,968	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$66,144	$56,949	-$9,195	-13.90%	$41,103	$37,033	-$4,070	-9.90%
Minimum	$6,086	$2,931	-$57,563	-51.84%	$4,958	$3,075	-$62,315	-37.98%
Maximum	$529,292	$481,845	$17,617	-8.96%	$250,775	$188,460	$22,622	-24.85%
Average CV[1]	0.37	0.30	-0.07	-18.91%	1.69	1.55	-0.14	-8.45%
Minimum	0.12	0.09	-0.33	-20.61%	0.22	0.19	-3.73	-11.74%
Maximum	1.41	1.11	0.10	-21.35%	35.28	34.52	2.07	-2.18%
Average Minimum	$92,742	$116,120	$23,378	25.21%	-$10,957	-$1,075	$9,882	90.19%
Minimum	-$24,742	-$1,888	-$13,416	92.37%	-$313,879	-$147,879	-$20,333	52.89%
Maximum	$783,502	$827,107	$166,000	5.57%	$218,015	$261,620	$166,000	20.00%
Average Maximum	$278,688	$271,585	-$7,103	-2.55%	$108,384	$104,697	-$3,687	-3.40%
Minimum	$25,147	$21,723	-$41,508	-13.62%	-$2,300	-$6,335	-$35,628	-175.44%
Maximum	$1,708,403	$1,680,736	$37,357	-1.62%	$719,861	$712,594	$84,436	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 138 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.4 Summary statistics for 219 SE Kansas farms assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$203,236	$203,236	$0	0.00%	$49,284	$49,284	$0	0.00%
Minimum	$15,560	$21,002	-$30,602	34.98%	-$19,073	-$20,493	-$1,420	-7.45%
Maximum	$1,160,123	$1,134,816	$30,961	-2.18%	$414,205	$388,898	-$25,307	-6.11%
Average Std Deviation	$64,803	$58,380	-$6,424	-9.91%	$41,280	$38,401	-$2,879	-6.97%
Minimum	$6,086	$2,942	-$57,025	-51.67%	$4,958	$3,097	-$1,861	-37.54%
Maximum	$529,292	$479,664	$16,995	-9.38%	$250,775	$239,336	-$11,439	-4.56%
Average CV[1]	0.33	0.28	-0.06	-17.03%	1.32	1.23	-0.09	-6.66%
Minimum	0.06	0.06	-0.76	4.14%	0.19	0.16	-0.03	-14.01%
Maximum	1.41	0.70	0.04	-50.38%	10.42	19.22	8.80	84.50%
Average Minimum	$118,185	$134,670	$16,486	13.95%	-$6,631	$382	$7,013	105.77%
Minimum	-$24,742	$15,292	-$31,777	161.81%	-$313,879	-$135,631	$178,248	56.79%
Maximum	$783,502	$800,031	$178,248	2.11%	$218,015	$234,545	$16,530	7.58%
Average Maximum	$298,628	$293,695	-$4,933	-1.65%	$111,852	$109,238	-$2,613	-2.34%
Minimum	$25,147	$26,773	-$31,639	6.47%	-$2,300	-$3,108	-$808	-35.14%
Maximum	$1,708,403	$1,685,628	$42,522	-1.33%	$719,861	$688,222	-$31,639	-4.40%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 200 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.5 Summary statistics for 153 SE Kansas farms with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,736	$185,486	$2,750	1.50%	$46,247	$48,997	$2,750	5.95%
Minimum	$15,560	$21,002	-$25,307	34.98%	-$10,968	-$13,450	-$2,483	-22.64%
Maximum	$1,160,123	$1,134,816	$30,961	-2.18%	$414,205	$388,898	-$25,307	-6.11%
Average Std Deviation	$66,144	$57,001	-$9,142	-13.82%	$41,103	$37,015	-$4,087	-9.94%
Minimum	$6,086	$2,942	-$57,025	-51.67%	$4,958	$3,097	-$1,861	-37.54%
Maximum	$529,292	$479,664	$16,995	-9.38%	$250,775	$186,419	-$64,355	-25.66%
Average CV[1]	0.37	0.28	-0.08	-22.71%	1.45	1.05	-0.39	-27.24%
Minimum	0.12	0.08	-0.76	-27.47%	0.22	0.16	-0.06	-25.53%
Maximum	1.41	0.69	0.04	-51.01%	10.42	13.28	2.87	27.52%
Average Minimum	$92,742	$119,027	$26,285	28.34%	-$10,957	$1,789	$12,746	116.33%
Minimum	-$24,742	$15,292	-$12,079	161.81%	-$313,879	-$135,631	$178,248	56.79%
Maximum	$783,502	$800,031	$178,248	2.11%	$218,015	$234,545	$16,530	7.58%
Average Maximum	$278,688	$274,462	-$4,226	-1.52%	$108,384	$107,476	-$908	-0.84%
Minimum	$25,147	$26,773	-$31,639	6.47%	-$2,300	-$3,108	-$808	-35.14%
Maximum	$1,708,403	$1,685,628	$42,522	-1.33%	$719,861	$688,222	-$31,639	-4.40%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 137 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.6 Summary statistics for 219 SE Kansas farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$203,236	$200,349	-$2,886	-1.42%	$49,284	$46,398	-$2,886	-5.86%
Minimum	$15,560	$20,606	-$45,976	32.43%	-$19,073	-$21,206	-$2,134	-11.19%
Maximum	$1,160,123	$1,118,451	$25,662	-3.59%	$414,205	$372,533	-$41,672	-10.06%
Average Std Deviation	$64,803	$58,383	-$6,421	-9.91%	$41,280	$38,388	-$2,892	-7.01%
Minimum	$6,086	$2,951	-$56,755	-51.50%	$4,958	$3,112	-$1,846	-37.23%
Maximum	$529,292	$478,569	$16,705	-9.58%	$250,775	$238,791	-$11,984	-4.78%
Average CV[1]	0.33	0.28	-0.05	-15.85%	1.29	1.53	0.24	18.94%
Minimum	0.06	0.06	-0.75	6.32%	0.19	0.17	-0.02	-11.82%
Maximum	1.41	0.71	0.05	-49.80%	10.42	71.03	60.61	581.91%
Average Minimum	$118,185	$131,850	$13,666	11.56%	-$6,631	-$2,458	$4,173	62.93%
Minimum	-$24,742	$14,956	-$47,742	160.45%	-$313,879	-$143,378	$170,501	54.32%
Maximum	$783,502	$782,778	$170,501	-0.09%	$218,015	$217,291	-$724	-0.33%
Average Maximum	$298,628	$290,828	-$7,800	-2.61%	$111,852	$106,336	-$5,516	-4.93%
Minimum	$25,147	$26,180	-$47,534	4.11%	-$2,300	-$3,514	-$1,214	-52.79%
Maximum	$1,708,403	$1,674,186	$32,777	-2.00%	$719,861	$672,327	-$47,534	-6.60%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 198 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.7 Summary statistics for 153 SE Kansas farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,736	$182,736	$0	0.00%	$46,247	$46,247	$0	0.00%
Minimum	$15,560	$20,606	-$41,672	32.43%	-$10,968	-$17,095	-$6,127	-55.86%
Maximum	$1,160,123	$1,118,451	$25,662	-3.59%	$414,205	$372,533	-$41,672	-10.06%
Average Std Deviation	$66,144	$57,031	-$9,113	-13.78%	$41,103	$37,012	-$4,091	-9.95%
Minimum	$6,086	$2,951	-$56,755	-51.50%	$4,958	$3,112	-$1,846	-37.23%
Maximum	$529,292	$478,569	$16,705	-9.58%	$250,775	$185,397	-$65,377	-26.07%
Average CV[1]	0.37	0.29	-0.08	-21.51%	1.45	1.62	0.17	11.91%
Minimum	0.12	0.09	-0.75	-26.63%	0.22	0.17	-0.05	-23.63%
Maximum	1.41	0.70	0.05	-50.50%	10.42	71.03	60.61	581.91%
Average Minimum	$92,742	$116,341	$23,600	25.45%	-$10,957	-$916	$10,041	91.64%
Minimum	-$24,742	$14,956	-$18,721	160.45%	-$313,879	-$143,378	$170,501	54.32%
Maximum	$783,502	$782,778	$170,501	-0.09%	$218,015	$217,291	-$724	-0.33%
Average Maximum	$278,688	$271,781	-$6,907	-2.48%	$108,384	$104,744	-$3,640	-3.36%
Minimum	$25,147	$26,180	-$47,534	4.11%	-$2,300	-$3,514	-$1,214	-52.79%
Maximum	$1,708,403	$1,674,186	$32,777	-2.00%	$719,861	$672,327	-$47,534	-6.60%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 137 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.8 Summary statistics for 126 SE Kansas crop farms assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$192,445	$192,445	$0	0.00%	$46,005	$46,005	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$10,968	-$10,968	$0	0.00%
Maximum	$1,034,902	$1,034,902	$0	0.00%	$264,961	$264,961	$0	0.00%
Average Std Deviation	$71,536	$62,941	-$8,595	-12.02%	$43,643	$38,792	-$4,851	-11.12%
Minimum	$6,509	$2,931	-$57,563	-54.97%	$5,076	$3,075	-$62,315	-39.42%
Maximum	$529,292	$481,845	$6,328	-8.96%	$250,775	$237,850	$16,902	-5.15%
Average CV[1]	0.37	0.31	-0.06	-16.93%	2.07	1.91	-0.16	-7.93%
Minimum	0.09	0.09	-0.30	-2.64%	0.22	0.23	-3.73	3.49%
Maximum	1.41	1.11	0.10	-21.35%	35.28	34.52	2.07	-2.18%
Average Minimum	$98,362	$119,286	$20,925	21.27%	-$13,789	-$3,136	$10,653	77.26%
Minimum	-$1,341	-$1,888	-$13,416	-40.78%	-$313,879	-$147,879	-$19,974	52.89%
Maximum	$729,900	$729,900	$166,000	0.00%	$168,481	$168,481	$166,000	0.00%
Average Maximum	$296,738	$289,756	-$6,983	-2.35%	$112,259	$107,593	-$4,666	-4.16%
Minimum	$25,147	$21,723	-$41,508	-13.62%	-$2,300	-$6,335	-$35,628	-175.44%
Maximum	$1,708,403	$1,680,736	$13,381	-1.62%	$686,230	$686,230	$38,922	0.00%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 115 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.9 Summary by frequency of claim for 126 SE Kansas crop farms assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	19	0.00%	$0	$7,994	$9,536	$128,077	$11,788	$0
1	39	3.64%	$4,813	$8,243	$9,833	$132,069	$11,908	$33,689
2	26	6.24%	$7,878	$7,875	$9,395	$126,184	$12,722	$27,572
3	25	10.26%	$11,506	$6,997	$8,346	$112,105	$13,465	$26,848
4	11	16.26%	$14,991	$5,753	$6,863	$92,174	$12,913	$26,233
5	4	24.00%	$14,558	$3,786	$4,516	$60,659	$17,519	$20,381
6	1	26.16%	$12,780	$3,049	$3,637	$48,850	$12,654	$14,910
7	1	30.52%	$23,156	$4,736	$5,649	$75,874	$14,621	$23,156

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (6.24%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (7.45%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.10 Summary statistics for 107 SE Kansas crop farms with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,705	$182,705	$0	0.00%	$43,199	$43,199	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$10,968	-$10,968	$0	0.00%
Maximum	$988,138	$988,138	$0	0.00%	$197,331	$197,331	$0	0.00%
Average Std Deviation	$69,997	$59,875	-$10,122	-14.46%	$43,624	$37,911	-$5,713	-13.10%
Minimum	$6,509	$2,931	-$57,563	-54.97%	$5,076	$3,075	-$62,315	-39.42%
Maximum	$529,292	$481,845	$6,328	-8.96%	$250,775	$188,460	$16,902	-24.85%
Average CV[1]	0.38	0.31	-0.07	-19.41%	1.92	1.72	-0.20	-10.24%
Minimum	0.12	0.09	-0.30	-20.61%	0.22	0.23	-3.73	3.49%
Maximum	1.41	1.11	0.10	-21.35%	35.28	34.52	2.07	-2.18%
Average Minimum	$88,113	$112,753	$24,640	27.96%	-$17,675	-$5,130	$12,544	70.97%
Minimum	-$1,341	-$1,888	-$13,416	-40.78%	-$313,879	-$147,879	-$19,974	52.89%
Maximum	$482,838	$492,817	$166,000	2.07%	$70,438	$83,158	$166,000	18.06%
Average Maximum	$283,864	$275,641	-$8,222	-2.90%	$109,380	$103,886	-$5,494	-5.02%
Minimum	$25,147	$21,723	-$41,508	-13.62%	-$2,300	-$6,335	-$35,628	-175.44%
Maximum	$1,708,403	$1,680,736	$13,381	-1.62%	$484,797	$476,248	$38,922	-1.76%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 96 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.11 Summary statistics for 126 SE Kansas crop farms assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$192,445	$192,445	$0	0.00%	$46,005	$46,005	$0	0.00%
Minimum	$15,560	$20,707	-$40,575	33.08%	-$10,968	-$7,170	-$40,575	34.62%
Maximum	$1,034,902	$994,326	$27,017	-3.92%	$264,961	$243,118	$27,017	-8.24%
Average Std Deviation	$71,536	$62,997	-$8,539	-11.94%	$43,643	$38,709	-$4,934	-11.31%
Minimum	$6,509	$2,949	-$56,824	-54.70%	$5,076	$3,108	-$65,116	-38.77%
Maximum	$529,292	$478,849	$5,192	-9.53%	$250,775	$235,873	$16,136	-5.94%
Average CV[1]	0.37	0.30	-0.07	-19.02%	1.49	1.46	-0.04	-2.45%
Minimum	0.09	0.08	-0.75	-10.30%	0.22	0.17	-7.32	-24.16%
Maximum	1.41	0.71	0.04	-49.95%	10.42	33.64	26.05	222.91%
Average Minimum	$98,362	$119,574	$21,212	21.57%	-$13,789	-$2,765	$11,024	79.95%
Minimum	-$1,341	$15,042	-$38,824	1221.90%	-$313,879	-$141,398	-$32,195	54.95%
Maximum	$729,900	$691,076	$172,481	-5.32%	$168,481	$148,615	$172,481	-11.79%
Average Maximum	$296,738	$289,936	-$6,803	-2.29%	$112,259	$107,549	-$4,710	-4.20%
Minimum	$25,147	$26,331	-$41,462	4.71%	-$2,300	-$3,410	-$44,446	-48.28%
Maximum	$1,708,403	$1,677,111	$22,469	-1.83%	$686,230	$641,784	$65,039	-6.48%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 112 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.12 Summary statistics for 107 SE Kansas crop farms with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,705	$184,124	$1,419	0.78%	$43,199	$44,619	$1,419	3.29%
Minimum	$15,560	$20,707	-$22,256	33.08%	-$10,968	-$7,170	-$22,256	34.62%
Maximum	$988,138	$988,542	$27,017	0.04%	$197,331	$193,512	$27,017	-1.94%
Average Std Deviation	$69,997	$59,995	-$10,002	-14.29%	$43,624	$37,863	-$5,761	-13.21%
Minimum	$6,509	$2,949	-$56,824	-54.70%	$5,076	$3,108	-$65,116	-38.77%
Maximum	$529,292	$478,849	$5,192	-9.53%	$250,775	$185,658	$16,136	-25.97%
Average CV[1]	0.38	0.30	-0.08	-22.22%	1.57	1.43	-0.14	-8.95%
Minimum	0.12	0.08	-0.75	-26.86%	0.22	0.17	-7.32	-24.16%
Maximum	1.41	0.70	0.04	-50.63%	10.42	33.64	26.05	222.91%
Average Minimum	$88,113	$114,421	$26,308	29.86%	-$17,675	-$3,420	$14,255	80.65%
Minimum	-$1,341	$15,042	-$12,939	1221.90%	-$313,879	-$141,398	-$29,947	54.95%
Maximum	$482,838	$469,899	$172,481	-2.68%	$70,438	$89,269	$172,481	26.73%
Average Maximum	$283,864	$277,335	-$6,529	-2.30%	$109,380	$105,338	-$4,042	-3.70%
Minimum	$25,147	$26,331	-$31,292	4.71%	-$2,300	-$3,410	-$31,404	-48.28%
Maximum	$1,708,403	$1,677,111	$22,469	-1.83%	$484,797	$461,920	$65,039	-4.72%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 95 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.13 Summary statistics for 126 SE Kansas crop farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$192,445	$191,007	-$1,438	-0.75%	$46,005	$44,567	-$1,438	-3.13%
Minimum	$15,560	$20,498	-$48,402	31.74%	-$10,968	-$7,423	-$48,402	32.32%
Maximum	$1,034,902	$986,500	$24,222	-4.68%	$264,961	$238,904	$24,222	-9.83%
Average Std Deviation	$71,536	$63,009	-$8,527	-11.92%	$43,643	$38,695	-$4,948	-11.34%
Minimum	$6,509	$2,955	-$56,681	-54.61%	$5,076	$3,117	-$65,655	-38.60%
Maximum	$529,292	$478,271	$4,976	-9.64%	$250,775	$235,499	$15,990	-6.09%
Average CV[1]	0.37	0.30	-0.07	-18.38%	1.44	1.30	-0.14	-9.52%
Minimum	0.09	0.09	-0.75	-9.70%	0.22	0.17	-6.72	-23.03%
Maximum	1.41	0.71	0.04	-49.64%	10.42	12.31	8.21	18.14%
Average Minimum	$98,362	$118,185	$19,823	20.15%	-$13,789	-$4,141	$9,648	69.97%
Minimum	-$1,341	$14,865	-$46,313	1208.68%	-$313,879	-$145,484	-$38,406	53.65%
Maximum	$729,900	$683,587	$168,395	-6.35%	$168,481	$144,783	$168,395	-14.07%
Average Maximum	$296,738	$288,534	-$8,204	-2.76%	$112,259	$106,104	-$6,155	-5.48%
Minimum	$25,147	$26,018	-$49,460	3.47%	-$2,300	-$3,625	-$53,019	-57.59%
Maximum	$1,708,403	$1,671,075	$21,261	-2.18%	$686,230	$633,211	$62,070	-7.73%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 111 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.14 Summary statistics for 107 SE Kansas crop farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,705	$182,705	$0	0.00%	$43,199	$43,199	$0	0.00%
Minimum	$15,560	$20,498	-$27,701	31.74%	-$10,968	-$7,423	-$27,701	32.32%
Maximum	$988,138	$983,283	$24,222	-0.49%	$197,331	$188,253	$24,222	-4.60%
Average Std Deviation	$69,997	$60,019	-$9,977	-14.25%	$43,624	$37,857	-$5,767	-13.22%
Minimum	$6,509	$2,955	-$56,681	-54.61%	$5,076	$3,117	-$65,655	-38.60%
Maximum	$529,292	$478,271	$4,976	-9.64%	$250,775	$185,120	$15,990	-26.18%
Average CV[1]	0.38	0.30	-0.08	-21.57%	1.50	1.20	-0.30	-20.28%
Minimum	0.12	0.09	-0.75	-26.37%	0.22	0.17	-6.72	-23.03%
Maximum	1.41	0.70	0.04	-50.36%	10.42	10.90	3.83	4.69%
Average Minimum	$88,113	$113,041	$24,928	28.29%	-$17,675	-$4,794	$12,880	72.88%
Minimum	-$1,341	$14,865	-$19,307	1208.68%	-$313,879	-$145,484	-$35,723	53.65%
Maximum	$482,838	$463,531	$168,395	-4.00%	$70,438	$86,958	$168,395	23.45%
Average Maximum	$283,864	$275,969	-$7,895	-2.78%	$109,380	$103,927	-$5,454	-4.99%
Minimum	$25,147	$26,018	-$37,328	3.47%	-$2,300	-$3,625	-$37,462	-57.59%
Maximum	$1,708,403	$1,671,075	$21,261	-2.18%	$484,797	$457,507	$62,070	-5.63%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 94 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.15 Summary statistics for 93 SE Kansas livestock farms assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$217,856	$217,856	$0	0.00%	$53,727	$53,727	$0	0.00%
Minimum	$21,555	$21,555	$0	0.00%	-$19,073	-$19,073	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$55,682	$52,348	-$3,334	-5.99%	$38,078	$37,957	-$121	-0.32%
Minimum	$6,086	$5,980	-$38,127	-1.74%	$4,958	$4,671	-$21,900	-5.78%
Maximum	$307,367	$297,418	$17,617	-3.24%	$240,432	$240,432	$22,622	0.00%
Average CV[1]	0.28	0.25	-0.03	-10.31%	1.05	1.03	-0.01	-1.26%
Minimum	0.06	0.06	-0.33	0.00%	0.19	0.19	-1.18	0.00%
Maximum	1.17	0.85	0.05	-27.73%	6.74	5.56	0.86	-17.53%
Average Minimum	$145,042	$154,550	$9,508	6.56%	$3,067	$5,047	$1,980	64.55%
Minimum	-$24,742	$10,737	-$6,930	143.40%	-$108,140	-$108,140	-$17,027	0.00%
Maximum	$783,502	$827,107	$102,164	5.57%	$218,015	$261,620	$56,936	20.00%
Average Maximum	$301,187	$299,138	-$2,049	-0.68%	$111,300	$111,707	$407	0.37%
Minimum	$31,509	$27,886	-$28,383	-11.50%	-$1,937	$3,262	-$16,591	268.43%
Maximum	$1,597,971	$1,590,704	$37,357	-0.45%	$719,861	$712,594	$84,436	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 87 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.16 Summary by frequency of claim for 93 SE Kansas livestock farms assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	47	0.00%	$0	$3,498	$7,602	$145,292	$11,048	$0
1	21	2.89%	$4,806	$4,001	$8,696	$166,190	$11,464	$33,642
2	14	4.72%	$3,405	$1,737	$3,775	$72,152	$6,943	$11,916
3	5	5.85%	$7,969	$3,278	$7,124	$136,148	$20,615	$18,594
4	2	13.68%	$20,683	$3,639	$7,909	$151,143	$21,259	$36,196
5	3	22.38%	$18,697	$2,012	$4,372	$83,545	$21,909	$26,176
6	1	21.52%	$18,666	$2,089	$4,539	$86,746	$32,289	$21,777
7	-	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (2.41%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (5.23%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.17 Summary statistics for 46 SE Kansas livestock farms with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,809	$182,809	$0	0.00%	$53,336	$53,336	$0	0.00%
Minimum	$21,555	$21,555	$0	0.00%	-$9,925	-$9,925	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$57,182	$50,442	-$6,741	-11.79%	$35,237	$34,993	-$244	-0.69%
Minimum	$6,086	$5,980	-$38,127	-1.74%	$4,958	$4,671	-$21,900	-5.78%
Maximum	$307,367	$297,418	$17,617	-3.24%	$178,094	$169,589	$22,622	-4.78%
Average CV[1]	0.33	0.28	-0.06	-17.40%	1.18	1.15	-0.03	-2.32%
Minimum	0.13	0.13	-0.33	-2.66%	0.22	0.19	-1.18	-12.83%
Maximum	1.17	0.85	0.05	-27.73%	6.74	5.56	0.86	-17.53%
Average Minimum	$103,509	$122,731	$19,223	18.57%	$4,668	$8,671	$4,002	85.74%
Minimum	-$24,742	$10,737	-$6,930	143.40%	-$76,207	-$76,290	-$17,027	0.11%
Maximum	$783,502	$827,107	$102,164	5.57%	$218,015	$261,620	$56,936	20.00%
Average Maximum	$266,648	$262,504	-$4,144	-1.55%	$106,067	$106,889	$823	0.78%
Minimum	$31,509	$27,886	-$28,383	-11.50%	-$1,937	$3,262	-$16,591	268.43%
Maximum	$1,597,971	$1,590,704	$37,357	-0.45%	$719,861	$712,594	$84,436	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 42 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.18 Summary statistics for 93 SE Kansas livestock farms assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$217,856	$217,856	$0	0.00%	$53,727	$53,727	$0	0.00%
Minimum	$21,555	$22,536	-$16,220	4.55%	-$19,073	-$19,826	-$16,220	-3.95%
Maximum	$1,160,123	$1,150,125	$25,495	-0.86%	$414,205	$404,207	$25,495	-2.41%
Average Std. Deviation	$55,682	$52,322	-$3,360	-6.03%	$38,078	$37,960	-$118	-0.31%
Minimum	$6,086	$5,721	-$38,049	-6.00%	$4,958	$4,193	-$21,952	-15.44%
Maximum	$307,367	$297,869	$17,280	-3.09%	$240,432	$239,849	$22,276	-0.24%
Average CV[1]	0.28	0.24	-0.04	-12.80%	1.05	0.96	-0.08	-8.10%
Minimum	0.06	0.06	-0.68	2.16%	0.19	0.20	-5.69	2.29%
Maximum	1.17	0.54	0.04	-53.58%	6.74	6.40	2.32	-5.01%
Average Minimum	$145,042	$154,584	$9,542	6.58%	$3,067	$4,988	$1,921	62.64%
Minimum	-$24,742	$16,042	-$16,843	164.84%	-$108,140	-$119,332	-$16,915	-10.35%
Maximum	$783,502	$816,171	$113,597	4.17%	$218,015	$250,684	$60,652	14.98%
Average Maximum	$301,187	$299,080	-$2,107	-0.70%	$111,300	$111,684	$384	0.34%
Minimum	$31,509	$31,560	-$16,770	0.16%	-$1,937	$3,224	-$16,770	266.45%
Maximum	$1,597,971	$1,581,201	$51,639	-1.05%	$719,861	$703,091	$93,804	-2.33%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 87 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.19 Summary statistics for 46 SE Kansas livestock farms with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,809	$186,383	$3,574	1.96%	$53,336	$56,910	$3,574	6.70%
Minimum	$21,555	$22,536	-$9,998	4.55%	-$9,925	-$10,041	-$9,998	-1.16%
Maximum	$1,160,123	$1,150,125	$25,495	-0.86%	$414,205	$404,207	$25,495	-2.41%
Average Std Deviation	$57,182	$50,434	-$6,748	-11.80%	$35,237	$35,012	-$225	-0.64%
Minimum	$6,086	$5,721	-$38,049	-6.00%	$4,958	$4,193	-$21,952	-15.44%
Maximum	$307,367	$297,869	$17,280	-3.09%	$178,094	$170,004	$22,276	-4.54%
Average CV[1]	0.33	0.26	-0.08	-22.43%	1.18	0.86	-0.32	-26.96%
Minimum	0.13	0.12	-0.68	-4.88%	0.22	0.20	-5.69	-12.49%
Maximum	1.17	0.54	0.04	-53.58%	6.74	3.06	0.37	-54.65%
Average Minimum	$103,509	$126,348	$22,839	22.07%	$4,668	$12,182	$7,513	160.94%
Minimum	-$24,742	$16,042	-$5,866	164.84%	-$76,207	-$60,944	-$5,866	20.03%
Maximum	$783,502	$816,171	$113,597	4.17%	$218,015	$250,684	$60,652	14.98%
Average Maximum	$266,648	$266,054	-$593	-0.22%	$106,067	$110,488	$4,422	4.17%
Minimum	$31,509	$31,560	-$16,770	0.16%	-$1,937	$3,224	-$16,770	266.45%
Maximum	$1,597,971	$1,581,201	$51,639	-1.05%	$719,861	$703,091	$93,804	-2.33%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 42 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.20 Summary statistics for 93 SE Kansas livestock farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$217,856	$214,014	-$3,842	-1.76%	$53,727	$49,885	-$3,842	-7.15%
Minimum	$21,555	$22,110	-$35,250	2.57%	-$19,073	-$20,709	-$35,250	-8.58%
Maximum	$1,160,123	$1,129,868	$23,516	-2.61%	$414,205	$383,950	$23,516	-7.30%
Average Std Deviation	$55,682	$52,295	-$3,387	-6.08%	$38,078	$37,967	-$112	-0.29%
Minimum	$6,086	$5,440	-$38,152	-10.62%	$4,958	$3,671	-$22,009	-25.95%
Maximum	$307,367	$298,400	$16,906	-2.92%	$240,432	$239,171	$21,874	-0.52%
Average CV[1]	0.28	0.25	-0.03	-11.38%	1.05	1.23	0.18	17.12%
Minimum	0.06	0.06	-0.66	4.79%	0.19	0.21	-5.47	7.28%
Maximum	1.17	0.55	0.05	-52.92%	6.74	18.90	14.81	180.23%
Average Minimum	$145,042	$150,780	$5,738	3.96%	$3,067	$1,071	-$1,996	-65.07%
Minimum	-$24,742	$15,622	-$36,605	163.14%	-$108,140	-$132,463	-$36,761	-22.49%
Maximum	$783,502	$794,815	$107,033	1.44%	$218,015	$229,328	$53,879	5.19%
Average Maximum	$301,187	$295,176	-$6,011	-2.00%	$111,300	$107,816	-$3,484	-3.13%
Minimum	$31,509	$30,742	-$36,445	-2.43%	-$1,937	$1,710	-$36,445	188.28%
Maximum	$1,597,971	$1,561,526	$39,576	-2.28%	$719,861	$683,416	$86,272	-5.06%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 87 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.21 Summary statistics for 46 SE Kansas livestock farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$182,809	$182,809	$0	0.00%	$53,336	$53,336	$0	0.00%
Minimum	$21,555	$22,110	-$30,255	2.57%	-$9,925	-$14,552	-$30,255	-46.61%
Maximum	$1,160,123	$1,129,868	$23,516	-2.61%	$414,205	$383,950	$23,516	-7.30%
Average Std Deviation	$57,182	$50,429	-$6,753	-11.81%	$35,237	$35,040	-$197	-0.56%
Minimum	$6,086	$5,440	-$38,152	-10.62%	$4,958	$3,671	-$22,009	-25.95%
Maximum	$307,367	$298,400	$16,906	-2.92%	$178,094	$170,494	$21,874	-4.27%
Average CV[1]	0.33	0.26	-0.07	-21.02%	1.18	0.98	-0.20	-17.17%
Minimum	0.13	0.12	-0.66	-4.80%	0.22	0.21	-5.47	-5.97%
Maximum	1.17	0.55	0.05	-52.92%	6.74	3.95	0.47	-41.42%
Average Minimum	$103,509	$122,818	$19,310	18.66%	$4,668	$8,523	$3,855	82.58%
Minimum	-$24,742	$15,622	-$14,088	163.14%	-$76,207	-$71,760	-$14,088	5.84%
Maximum	$783,502	$794,815	$107,033	1.44%	$218,015	$229,328	$53,879	5.19%
Average Maximum	$266,648	$262,464	-$4,183	-1.57%	$106,067	$106,942	$876	0.83%
Minimum	$31,509	$30,742	-$36,445	-2.43%	-$1,937	$1,710	-$36,445	188.28%
Maximum	$1,597,971	$1,561,526	$39,576	-2.28%	$719,861	$683,416	$86,272	-5.06%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 42 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.22 Summary statistics for 64 SE Kansas beef farms assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$185,560	$185,560	$0	0.00%	$47,284	$47,284	$0	0.00%
Minimum	$21,555	$21,555	$0	0.00%	-$19,073	-$19,073	$0	0.00%
Maximum	$980,749	$980,749	$0	0.00%	$270,425	$270,425	$0	0.00%
Average Std Deviation	$53,685	$50,229	-$3,456	-6.44%	$38,130	$38,473	$343	0.90%
Minimum	$6,086	$5,980	-$38,127	-1.74%	$4,958	$4,671	-$19,715	-5.78%
Maximum	$236,606	$214,462	$17,617	-9.36%	$240,432	$240,432	$22,622	0.00%
Average CV[1]	0.31	0.28	-0.03	-10.05%	1.22	1.21	-0.01	-0.72%
Minimum	0.09	0.09	-0.33	0.00%	0.20	0.19	-1.18	-4.89%
Maximum	1.17	0.85	0.05	-27.73%	6.74	5.56	0.86	-17.53%
Average Minimum	$115,506	$125,678	$10,172	8.81%	-$2,969	-$1,263	$1,706	57.46%
Minimum	-$24,742	$10,737	-$6,930	143.40%	-$108,140	-$108,140	-$17,027	0.00%
Maximum	$744,319	$744,319	$102,164	0.00%	$111,697	$94,670	$56,936	-15.24%
Average Maximum	$267,553	$265,681	-$1,872	-0.70%	$106,023	$106,867	$843	0.80%
Minimum	$31,509	$27,886	-$27,182	-11.50%	$9,427	$9,347	-$16,591	-0.85%
Maximum	$1,308,513	$1,308,513	$37,357	0.00%	$661,206	$661,206	$84,436	0.00%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 60 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.23 Summary by frequency of claim for 64 SE Kansas beef farms assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	31	0.00%	$0	$3,544	$6,971	$115,890	$9,218	$0
1	15	4.09%	$5,706	$4,270	$8,397	$139,606	$10,248	$39,941
2	10	4.65%	$3,274	$2,153	$4,234	$70,390	$6,212	$11,460
3	4	6.93%	$9,029	$3,984	$7,835	$130,262	$22,636	$21,067
4	1	8.86%	$12,984	$4,481	$8,812	$146,507	$29,025	$7,574
5	3	22.38%	$18,697	$2,555	$5,025	$83,545	$21,909	$26,176
6	0	-	-	-	-	-	-	-
7	0	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (3.06%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (6.01%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.24 Summary statistics for 33 SE Kansas beef farms with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$161,763	$161,763	$0	0.00%	$46,276	$46,276	$0	0.00%
Minimum	$21,555	$21,555	$0	0.00%	-$6,426	-$6,426	$0	0.00%
Maximum	$438,132	$438,132	$0	0.00%	$179,896	$179,896	$0	0.00%
Average Std Deviation	$54,622	$47,920	-$6,702	-12.27%	$32,928	$33,593	$665	2.02%
Minimum	$6,086	$5,980	-$38,127	-1.74%	$4,958	$4,671	-$19,715	-5.78%
Maximum	$236,606	$214,462	$17,617	-9.36%	$96,832	$96,432	$22,622	-0.41%
Average CV[1]	0.36	0.30	-0.06	-16.75%	1.31	1.29	-0.02	-1.31%
Minimum	0.16	0.14	-0.33	-9.21%	0.22	0.19	-1.18	-12.83%
Maximum	1.17	0.85	0.05	-27.73%	6.74	5.56	0.86	-17.53%
Average Minimum	$84,504	$104,232	$19,728	23.35%	-$840	$2,468	$3,308	393.83%
Minimum	-$24,742	$10,737	-$6,930	143.40%	-$76,207	-$76,290	-$17,027	0.11%
Maximum	$322,123	$323,102	$102,164	0.30%	$111,697	$94,670	$56,936	-15.24%
Average Maximum	$241,200	$237,570	-$3,630	-1.51%	$95,541	$97,176	$1,635	1.71%
Minimum	$31,509	$27,886	-$27,182	-11.50%	$10,692	$9,347	-$16,591	-12.58%
Maximum	$872,539	$855,798	$37,357	-1.92%	$282,174	$303,294	$84,436	7.48%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 31 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.25 Summary statistics for 64 SE Kansas beef farms assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$185,560	$185,560	$0	0.00%	$47,284	$47,284	$0	0.00%
Minimum	$21,555	$22,438	-$20,603	4.10%	-$19,073	-$20,029	-$20,603	-5.01%
Maximum	$980,749	$960,146	$25,039	-2.10%	$270,425	$256,047	$25,039	-5.32%
Average Std Deviation	$53,685	$50,173	-$3,512	-6.54%	$38,130	$38,453	$323	0.85%
Minimum	$6,086	$5,653	-$38,073	-7.11%	$4,958	$4,068	-$19,727	-17.95%
Maximum	$236,606	$214,057	$17,191	-9.53%	$240,432	$239,692	$22,183	-0.31%
Average CV[1]	0.31	0.27	-0.04	-12.64%	1.22	1.16	-0.06	-5.18%
Minimum	0.09	0.09	-0.67	1.79%	0.20	0.20	-5.65	-2.97%
Maximum	1.17	0.55	0.04	-53.43%	6.74	7.56	3.47	12.10%
Average Minimum	$115,506	$125,712	$10,207	8.84%	-$2,969	-$1,271	$1,698	57.20%
Minimum	-$24,742	$15,945	-$21,394	164.45%	-$108,140	-$122,356	-$21,486	-13.15%
Maximum	$744,319	$730,103	$112,085	-1.91%	$111,697	$104,401	$59,092	-6.53%
Average Maximum	$267,553	$265,554	-$1,999	-0.75%	$106,023	$106,781	$758	0.71%
Minimum	$31,509	$31,236	-$19,049	-0.87%	$9,427	$8,672	-$21,126	-8.01%
Maximum	$1,308,513	$1,289,464	$48,861	-1.46%	$661,206	$645,274	$92,070	-2.41%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 60 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.26 Summary statistics for 33 SE Kansas beef farms with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$161,763	$165,092	$3,329	2.06%	$46,276	$49,606	$3,329	7.19%
Minimum	$21,555	$22,438	-$8,294	4.10%	-$6,426	-$6,435	-$8,294	-0.15%
Maximum	$438,132	$440,241	$25,039	0.48%	$179,896	$188,516	$25,039	4.79%
Average Std Deviation	$54,622	$47,878	-$6,744	-12.35%	$32,928	$33,582	$655	1.99%
Minimum	$6,086	$5,653	-$38,073	-7.11%	$4,958	$4,068	-$19,727	-17.95%
Maximum	$236,606	$214,057	$17,191	-9.53%	$96,832	$96,359	$22,183	-0.49%
Average CV[1]	0.36	0.28	-0.08	-22.01%	1.31	0.96	-0.35	-26.80%
Minimum	0.16	0.14	-0.67	-10.11%	0.22	0.20	-5.65	-11.07%
Maximum	1.17	0.55	0.04	-53.43%	6.74	3.23	0.39	-52.16%
Average Minimum	$84,504	$107,593	$23,089	27.32%	-$840	$5,779	$6,619	787.99%
Minimum	-$24,742	$15,945	-$7,759	164.45%	-$76,207	-$63,435	-$7,759	16.76%
Maximum	$322,123	$314,364	$112,085	-2.41%	$111,697	$104,401	$59,092	-6.53%
Average Maximum	$241,200	$240,800	-$400	-0.17%	$95,541	$100,449	$4,909	5.14%
Minimum	$31,509	$31,236	-$9,016	-0.87%	$10,692	$10,260	-$9,016	-4.04%
Maximum	$872,539	$865,423	$48,861	-0.82%	$282,174	$310,928	$92,070	10.19%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 31 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.27 Summary statistics for 64 SE Kansas beef farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$185,560	$182,184	-$3,376	-1.82%	$47,284	$43,907	-$3,376	-7.14%
Minimum	$21,555	$21,992	-$40,521	2.03%	-$19,073	-$20,953	-$40,521	-9.86%
Maximum	$980,749	$940,229	$22,968	-4.13%	$270,425	$242,148	$22,968	-10.46%
Average Std Deviation	$53,685	$50,123	-$3,562	-6.64%	$38,130	$38,439	$309	0.81%
Minimum	$6,086	$5,368	-$38,180	-11.80%	$4,958	$3,537	-$19,738	-28.66%
Maximum	$236,606	$213,666	$16,806	-9.70%	$240,432	$238,984	$21,763	-0.60%
Average CV[1]	0.31	0.27	-0.03	-11.20%	1.22	1.88	0.66	53.84%
Minimum	0.09	0.09	-0.65	3.62%	0.20	0.21	-5.39	4.75%
Maximum	1.17	0.55	0.05	-52.74%	6.74	40.87	36.78	506.06%
Average Minimum	$115,506	$122,369	$6,864	5.94%	-$2,969	-$4,662	-$1,693	-57.03%
Minimum	-$24,742	$15,500	-$42,077	162.65%	-$108,140	-$136,099	-$42,257	-25.85%
Maximum	$744,319	$716,360	$105,216	-3.76%	$111,697	$97,347	$52,003	-12.85%
Average Maximum	$267,553	$262,068	-$5,485	-2.05%	$106,023	$103,324	-$2,699	-2.55%
Minimum	$31,509	$30,627	-$37,464	-2.80%	$9,427	$7,942	-$41,550	-15.75%
Maximum	$1,308,513	$1,271,049	$36,235	-2.86%	$661,206	$629,871	$84,186	-4.74%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 60 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.28 Summary statistics for 33 SE Kansas beef farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$161,763	$161,763	$0	0.00%	$46,276	$46,276	$0	0.00%
Minimum	$21,555	$21,992	-$16,470	2.03%	-$6,426	-$7,252	-$16,470	-12.86%
Maximum	$438,132	$433,106	$22,968	-1.15%	$179,896	$181,586	$22,968	0.94%
Average Std Deviation	$54,622	$47,843	-$6,780	-12.41%	$32,928	$33,579	$651	1.98%
Minimum	$6,086	$5,368	-$38,180	-11.80%	$4,958	$3,537	-$19,738	-28.66%
Maximum	$236,606	$213,666	$16,806	-9.70%	$96,832	$96,291	$21,763	-0.56%
Average CV[1]	0.36	0.29	-0.07	-20.56%	1.31	1.12	-0.19	-14.49%
Minimum	0.16	0.15	-0.65	-7.77%	0.22	0.21	-5.39	-3.99%
Maximum	1.17	0.55	0.05	-52.74%	6.74	4.30	0.50	-36.26%
Average Minimum	$84,504	$104,294	$19,790	23.42%	-$840	$2,422	$3,262	388.35%
Minimum	-$24,742	$15,500	-$16,365	162.65%	-$76,207	-$74,755	-$16,365	1.90%
Maximum	$322,123	$305,758	$105,216	-5.08%	$111,697	$97,347	$52,003	-12.85%
Average Maximum	$241,200	$237,400	-$3,800	-1.58%	$95,541	$97,066	$1,525	1.60%
Minimum	$31,509	$30,627	-$17,731	-2.80%	$10,692	$9,842	-$17,731	-7.95%
Maximum	$872,539	$858,544	$36,235	-1.60%	$282,174	$303,044	$84,186	7.40%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 31 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.29 Summary statistics for 13 SE Kansas dairy farms assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$337,798	$337,798	$0	0.00%	$80,406	$80,406	$0	0.00%
Minimum	$96,585	$96,585	$0	0.00%	-$9,925	-$9,925	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$65,604	$63,723	-$1,881	-2.87%	$37,095	$36,118	-$977	-2.63%
Minimum	$7,259	$7,259	-$9,949	0.00%	$11,344	$11,344	-$8,505	0.00%
Maximum	$307,367	$297,418	$0	-3.24%	$178,094	$169,589	$1,738	-4.78%
Average CV[1]	0.18	0.18	-0.01	-4.72%	0.51	0.50	-0.01	-2.35%
Minimum	0.06	0.06	-0.07	0.00%	0.19	0.19	-0.10	0.00%
Maximum	0.34	0.27	0.00	-19.57%	0.80	0.80	0.00	0.00%
Average Minimum	$259,927	$266,592	$6,665	2.56%	$33,780	$36,665	$2,884	8.54%
Minimum	$67,497	$74,677	-$1,717	10.64%	-$29,840	-$33,569	-$3,729	-12.50%
Maximum	$783,502	$827,107	$43,605	5.57%	$218,015	$261,620	$43,605	20.00%
Average Maximum	$436,698	$435,182	-$1,516	-0.35%	$140,919	$139,612	-$1,307	-0.93%
Minimum	$126,101	$126,101	-$7,267	0.00%	$7,833	$6,815	-$7,267	-12.99%
Maximum	$1,597,971	$1,590,704	$0	-0.45%	$719,861	$712,594	$0	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 12 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.30 Summary by frequency of claim for 13 SE Kansas dairy farms assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm /Year[7]
0	9	0.00%	$0	$1,373	$3,681	$195,720	$10,677	$0
1	2	1.14%	$4,492	$2,771	$7,429	$395,000	$18,673	$31,446
2	1	7.14%	$6,989	$687	$1,841	$97,911	$9,217	$24,461
3	1	2.34%	$3,729	$1,120	$3,003	$159,694	$12,535	$8,702
4	0	-	-	-	-	-	-	-
5	0	-	-	-	-	-	-	-
6	0	-	-	-	-	-	-	-
7	0	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (0.70%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (1.88%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.31 Summary statistics for 4 SE Kansas dairy farms with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$393,455	$393,455	$0	0.00%	$120,976	$120,976	$0	0.00%
Minimum	$96,585	$96,585	$0	0.00%	-$9,925	-$9,925	$0	0.00%
Maximum	$1,160,123	$1,160,123	$0	0.00%	$414,205	$414,205	$0	0.00%
Average Std Deviation	$103,222	$97,110	-$6,112	-5.92%	$61,197	$58,023	-$3,174	-5.19%
Minimum	$22,666	$21,297	-$9,949	-6.04%	$14,107	$15,845	-$8,505	12.32%
Maximum	$307,367	$297,418	-$1,369	-3.24%	$178,094	$169,589	$1,738	-4.78%
Average CV[1]	0.26	0.23	-0.03	-10.80%	0.59	0.54	-0.05	-8.20%
Minimum	0.20	0.18	-0.07	-11.43%	0.43	0.41	-0.10	-4.78%
Maximum	0.34	0.27	-0.01	-19.57%	0.69	0.66	-0.02	-4.14%
Average Minimum	$266,315	$287,977	$21,662	8.13%	$52,569	$61,943	$9,374	17.83%
Minimum	$67,497	$74,677	-$1,717	10.64%	-$29,840	-$33,569	-$3,729	-12.50%
Maximum	$783,502	$827,107	$43,605	5.57%	$218,015	$261,620	$43,605	20.00%
Average Maximum	$546,397	$541,472	-$4,926	-0.90%	$222,657	$218,409	-$4,248	-1.91%
Minimum	$138,934	$137,217	-$7,267	-1.24%	$7,833	$6,815	-$7,267	-12.99%
Maximum	$1,597,971	$1,590,704	-$1,717	-0.45%	$719,861	$712,594	-$1,018	-1.01%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 3 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.32 Summary statistics for 13 SE Kansas dairy farms assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$337,798	$337,798	$0	0.00%	$80,406	$80,406	$0	0.00%
Minimum	$96,585	$97,791	-$2,577	1.25%	-$9,925	-$7,316	-$2,577	26.29%
Maximum	$1,160,123	$1,162,361	$6,302	0.19%	$414,205	$416,443	$6,302	0.54%
Average Std Deviation	$65,604	$63,729	-$1,874	-2.86%	$37,095	$36,134	-$961	-2.59%
Minimum	$7,259	$7,268	-$9,817	0.12%	$11,344	$11,329	-$8,385	-0.14%
Maximum	$307,367	$297,549	$62	-3.19%	$178,094	$169,710	$1,741	-4.71%
Average CV[1]	0.18	0.17	-0.01	-5.24%	0.51	0.50	-0.01	-1.58%
Minimum	0.06	0.06	-0.08	0.62%	0.19	0.19	-0.15	0.95%
Maximum	0.34	0.26	0.00	-23.23%	0.80	0.82	0.03	2.79%
Average Minimum	$259,927	$266,586	$6,660	2.56%	$33,780	$36,615	$2,834	8.39%
Minimum	$67,497	$75,932	-$2,443	12.50%	-$29,840	-$31,027	-$2,563	-3.98%
Maximum	$783,502	$829,071	$45,570	5.82%	$218,015	$263,585	$45,570	20.90%
Average Maximum	$436,698	$435,194	-$1,504	-0.34%	$140,919	$139,645	-$1,275	-0.90%
Minimum	$126,101	$125,519	-$4,885	-0.46%	$7,833	$9,495	-$4,885	21.22%
Maximum	$1,597,971	$1,593,086	-$482	-0.31%	$719,861	$714,976	$1,662	-0.68%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 12 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.33 Summary statistics for 4 SE Kansas dairy farms with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$393,455	$396,544	$3,089	0.79%	$120,976	$124,064	$3,089	2.55%
Minimum	$96,585	$97,791	$1,206	1.25%	-$9,925	-$7,316	$1,206	26.29%
Maximum	$1,160,123	$1,162,361	$6,302	0.19%	$414,205	$416,443	$6,302	0.54%
Average Std Deviation	$103,222	$97,131	-$6,091	-5.90%	$61,197	$58,063	-$3,134	-5.12%
Minimum	$22,666	$21,290	-$9,817	-6.07%	$14,107	$15,848	-$8,385	12.34%
Maximum	$307,367	$297,549	-$1,375	-3.19%	$178,094	$169,710	$1,741	-4.71%
Average CV[1]	0.26	0.23	-0.03	-12.55%	0.59	0.51	-0.08	-13.22%
Minimum	0.20	0.18	-0.08	-12.79%	0.43	0.41	-0.15	-5.22%
Maximum	0.34	0.26	-0.01	-23.23%	0.69	0.63	-0.02	-8.50%
Average Minimum	$266,315	$291,077	$24,762	9.30%	$52,569	$64,957	$12,388	23.57%
Minimum	$67,497	$75,932	-$463	12.50%	-$29,840	-$31,027	-$1,187	-3.98%
Maximum	$783,502	$829,071	$45,570	5.82%	$218,015	$263,585	$45,570	20.90%
Average Maximum	$546,397	$544,617	-$1,780	-0.33%	$222,657	$221,575	-$1,081	-0.49%
Minimum	$138,934	$138,452	-$4,885	-0.35%	$7,833	$9,495	-$4,885	21.22%
Maximum	$1,597,971	$1,593,086	-$482	-0.31%	$719,861	$714,976	$1,662	-0.68%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 3 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.34 Summary statistics for 13 SE Kansas dairy farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$337,798	$335,250	-$2,548	-0.75%	$80,406	$77,858	-$2,548	-3.17%
Minimum	$96,585	$96,931	-$6,909	0.36%	-$9,925	-$9,199	-$6,909	7.31%
Maximum	$1,160,123	$1,153,904	$5,147	-0.54%	$414,205	$407,986	$5,147	-1.50%
Average Std Deviation	$65,604	$63,740	-$1,864	-2.84%	$37,095	$36,161	-$933	-2.52%
Minimum	$7,259	$7,283	-$9,596	0.33%	$11,344	$11,303	-$8,181	-0.36%
Maximum	$307,367	$297,770	$168	-3.12%	$178,094	$169,913	$1,747	-4.59%
Average CV[1]	0.18	0.18	-0.01	-4.50%	0.51	0.53	0.02	3.19%
Minimum	0.06	0.06	-0.08	1.68%	0.19	0.20	-0.14	2.52%
Maximum	0.34	0.26	0.00	-22.56%	0.80	0.86	0.08	7.86%
Average Minimum	$259,927	$264,029	$4,102	1.58%	$33,780	$33,983	$202	0.60%
Minimum	$67,497	$75,154	-$6,550	11.34%	-$29,840	-$33,023	-$6,873	-10.67%
Maximum	$783,502	$820,155	$39,574	4.68%	$218,015	$254,668	$36,653	16.81%
Average Maximum	$436,698	$432,664	-$4,033	-0.92%	$140,919	$137,151	-$3,769	-2.67%
Minimum	$126,101	$124,539	-$13,099	-1.24%	$7,833	$7,730	-$13,099	-1.32%
Maximum	$1,597,971	$1,584,872	-$1,292	-0.82%	$719,861	$706,762	-$103	-1.82%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 12 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.35 Summary statistics for 4 SE Kansas dairy farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$393,455	$393,455	$0	0.00%	$120,976	$120,976	$0	0.00%
Minimum	$96,585	$96,931	-$6,219	0.36%	-$9,925	-$9,199	-$6,219	7.31%
Maximum	$1,160,123	$1,153,904	$5,147	-0.54%	$414,205	$407,986	$5,147	-1.50%
Average Std Deviation	$103,222	$97,166	-$6,057	-5.87%	$61,197	$58,130	-$3,067	-5.01%
Minimum	$22,666	$21,280	-$9,596	-6.11%	$14,107	$15,855	-$8,181	12.39%
Maximum	$307,367	$297,770	-$1,386	-3.12%	$178,094	$169,913	$1,747	-4.59%
Average CV[1]	0.26	0.23	-0.03	-11.83%	0.59	0.52	-0.06	-10.90%
Minimum	0.20	0.18	-0.08	-12.11%	0.43	0.42	-0.14	-3.14%
Maximum	0.34	0.26	-0.01	-22.56%	0.69	0.65	-0.01	-5.35%
Average Minimum	$266,315	$288,007	$21,692	8.15%	$52,569	$61,743	$9,174	17.45%
Minimum	$67,497	$75,154	-$1,240	11.34%	-$29,840	-$33,023	-$3,183	-10.67%
Maximum	$783,502	$820,155	$39,574	4.68%	$218,015	$254,668	$36,653	16.81%
Average Maximum	$546,397	$541,624	-$4,774	-0.87%	$222,657	$218,617	-$4,039	-1.81%
Minimum	$138,934	$137,642	-$13,099	-0.93%	$7,833	$7,730	-$13,099	-1.32%
Maximum	$1,597,971	$1,584,872	-$1,292	-0.82%	$719,861	$706,762	-$103	-1.82%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 3 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.36 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$54,210	$54,210	$0	0.00%	$8,508	$8,508	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$10,968	-$10,968	$0	0.00%
Maximum	$99,351	$99,351	$0	0.00%	$29,156	$29,156	$0	0.00%
Average Std Deviation	$20,682	$17,034	-$3,648	-17.64%	$13,376	$12,447	-$930	-6.95%
Minimum	$6,509	$2,931	-$12,187	-54.97%	$5,076	$3,075	-$6,806	-39.42%
Maximum	$67,890	$67,890	$0	0.00%	$21,761	$20,071	$9,214	-7.77%
Average CV[1]	0.40	0.31	-0.09	-21.54%	2.52	2.48	-0.04	-1.66%
Minimum	0.14	0.09	-0.30	-36.01%	0.54	0.50	-0.86	-7.40%
Maximum	1.41	1.11	0.00	-21.35%	30.78	30.78	0.83	0.00%
Average Minimum	$30,157	$35,930	$5,773	19.14%	-$10,318	-$9,052	$1,266	12.27%
Minimum	-$1,341	-$1,888	-$547	-40.78%	-$34,758	-$41,126	-$19,974	-18.32%
Maximum	$62,792	$62,792	$23,204	0.00%	$10,404	$8,043	$17,061	-22.70%
Average Maximum	$87,141	$83,129	-$4,012	-4.60%	$27,883	$26,524	-$1,360	-4.88%
Minimum	$25,147	$21,723	-$19,974	-13.62%	-$2,300	-$6,335	-$10,900	-175.44%
Maximum	$248,226	$248,226	$0	0.00%	$53,895	$50,750	$20,316	-5.83%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 24 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.37 Summary by frequency of claim for 33 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	7	0.00%	$0	$4,163	$5,256	$37,726	$4,035	$0
1	5	4.21%	$1,291	$3,381	$4,268	$30,637	$2,721	$9,036
2	4	10.36%	$4,174	$4,447	$5,614	$40,299	$3,337	$14,608
3	8	12.33%	$5,216	$4,667	$5,892	$42,292	$5,871	$12,171
4	6	14.73%	$6,057	$4,538	$5,729	$41,118	$7,275	$10,600
5	2	45.10%	$13,103	$3,206	$4,047	$29,051	$10,912	$18,344
6	1	26.16%	$12,780	$5,391	$6,806	$48,850	$12,654	$14,910
7	0	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (11.04%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (13.93%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.38 Summary statistics for 26 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$48,320	$48,320	$0	0.00%	$7,624	$7,624	$0	0.00%
Minimum	$15,560	$15,560	$0	0.00%	-$10,968	-$10,968	$0	0.00%
Maximum	$82,102	$82,102	$0	0.00%	$29,156	$29,156	$0	0.00%
Average Std Deviation	$18,507	$13,877	-$4,630	-25.02%	$12,967	$11,787	-$1,180	-9.10%
Minimum	$6,509	$2,931	-$12,187	-54.97%	$5,076	$3,075	-$6,806	-39.42%
Maximum	$38,525	$32,047	-$285	-16.82%	$21,761	$18,976	$9,214	-12.80%
Average CV[1]	0.41	0.30	-0.11	-26.52%	1.18	1.12	-0.06	-5.01%
Minimum	0.14	0.09	-0.30	-36.01%	0.54	0.50	-0.86	-7.40%
Maximum	1.41	1.11	0.00	-21.35%	2.83	3.03	0.83	6.91%
Average Minimum	$25,158	$32,485	$7,327	29.12%	-$11,038	-$9,432	$1,606	14.55%
Minimum	-$1,341	-$1,888	-$547	-40.78%	-$34,758	-$41,126	-$19,974	-18.32%
Maximum	$56,241	$57,924	$23,204	2.99%	$10,404	$8,043	$17,061	-22.70%
Average Maximum	$75,919	$70,826	-$5,092	-6.71%	$25,967	$24,241	-$1,726	-6.65%
Minimum	$25,147	$21,723	-$19,974	-13.62%	-$2,300	-$6,335	-$10,900	-175.44%
Maximum	$127,361	$122,855	-$369	-3.54%	$53,895	$48,795	$20,316	-9.46%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 17 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.39 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$54,210	$54,210	$0	0.00%	$8,508	$8,508	$0	0.00%
Minimum	$15,560	$19,875	-$5,364	27.73%	-$10,968	-$8,176	-$5,364	25.45%
Maximum	$99,351	$93,987	$15,478	-5.40%	$29,156	$28,632	$15,478	-1.80%
Average Std Deviation	$20,682	$16,972	-$3,710	-17.94%	$13,376	$12,399	-$977	-7.30%
Minimum	$6,509	$2,977	-$12,766	-54.27%	$5,076	$3,147	-$6,325	-38.00%
Maximum	$67,890	$67,948	$58	0.09%	$21,761	$20,032	$9,183	-7.94%
Average CV[1]	0.40	0.30	-0.10	-24.90%	1.15	2.37	1.23	107.24%
Minimum	0.14	0.09	-0.74	-39.22%	0.54	0.47	-0.97	-14.26%
Maximum	1.41	0.72	0.04	-48.68%	2.83	27.23	24.40	862.37%
Average Minimum	$30,157	$36,215	$6,058	20.09%	-$10,318	-$8,900	$1,418	13.74%
Minimum	-$1,341	$14,336	-$5,447	1169.26%	-$34,758	-$35,492	-$6,390	-2.11%
Maximum	$62,792	$60,391	$24,436	-3.82%	$10,404	$6,412	$17,284	-38.37%
Average Maximum	$87,141	$83,160	-$3,981	-4.57%	$27,883	$26,490	-$1,393	-5.00%
Minimum	$25,147	$25,085	-$6,784	-0.25%	-$2,300	-$4,264	-$6,784	-85.37%
Maximum	$248,226	$243,320	-$62	-1.98%	$53,895	$50,107	$25,346	-7.03%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 22 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.40 Summary statistics for 26 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$48,320	$49,441	$1,121	2.32%	$7,624	$8,745	$1,121	14.70%
Minimum	$15,560	$19,875	-$4,940	27.73%	-$10,968	-$8,176	-$4,940	25.45%
Maximum	$82,102	$78,211	$15,478	-4.74%	$29,156	$28,632	$15,478	-1.80%
Average Std Deviation	$18,507	$13,836	-$4,671	-25.24%	$12,967	$11,743	-$1,225	-9.44%
Minimum	$6,509	$2,977	-$12,766	-54.27%	$5,076	$3,147	-$6,325	-38.00%
Maximum	$38,525	$32,083	-$205	-16.72%	$21,761	$18,823	$9,183	-13.50%
Average CV[1]	0.41	0.28	-0.13	-31.84%	1.18	2.62	1.44	121.72%
Minimum	0.14	0.09	-0.74	-39.22%	0.54	0.47	-0.97	-14.26%
Maximum	1.41	0.71	0.03	-49.51%	2.83	27.23	24.40	862.37%
Average Minimum	$25,158	$33,927	$8,769	34.86%	-$11,038	-$8,176	$2,863	25.94%
Minimum	-$1,341	$14,336	-$3,215	1169.26%	-$34,758	-$35,492	-$6,390	-2.11%
Maximum	$56,241	$60,391	$24,436	7.38%	$10,404	$6,412	$17,284	-38.37%
Average Maximum	$75,919	$72,016	-$3,903	-5.14%	$25,967	$25,332	-$634	-2.44%
Minimum	$25,147	$25,085	-$6,784	-0.25%	-$2,300	-$4,264	-$6,784	-85.37%
Maximum	$127,361	$123,727	-$62	-2.85%	$53,895	$50,107	$25,346	-7.03%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 17 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.41 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$54,210	$53,095	-$1,115	-2.06%	$8,508	$7,393	-$1,115	-13.10%
Minimum	$15,560	$19,372	-$6,771	24.50%	-$10,968	-$8,930	-$6,771	18.58%
Maximum	$99,351	$92,579	$14,298	-6.82%	$29,156	$27,467	$14,298	-5.79%
Average Std Deviation	$20,682	$16,961	-$3,721	-17.99%	$13,376	$12,394	-$983	-7.35%
Minimum	$6,509	$3,001	-$12,915	-53.91%	$5,076	$3,177	-$6,327	-37.42%
Maximum	$67,890	$67,966	$75	0.11%	$21,761	$20,023	$9,205	-7.98%
Average CV[1]	0.40	0.30	-0.09	-23.44%	1.06	1.51	0.44	41.50%
Minimum	0.14	0.09	-0.73	-37.77%	0.54	0.51	-0.75	-6.69%
Maximum	1.41	0.73	0.05	-47.89%	2.74	8.19	5.45	198.79%
Average Minimum	$30,157	$35,168	$5,011	16.62%	-$10,318	-$9,979	$340	3.29%
Minimum	-$1,341	$13,910	-$6,877	1137.47%	-$34,758	-$36,465	-$8,067	-4.91%
Maximum	$62,792	$59,042	$23,227	-5.97%	$10,404	$4,931	$16,093	-52.60%
Average Maximum	$87,141	$82,055	-$5,086	-5.84%	$27,883	$25,366	-$2,517	-9.03%
Minimum	$25,147	$24,332	-$8,564	-3.24%	-$2,300	-$4,779	-$8,564	-107.77%
Maximum	$248,226	$242,032	-$815	-2.50%	$53,895	$49,112	$24,215	-8.87%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 21 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.42 Summary statistics for 26 SE Kansas crop farms with Value of Farm Production (VFP) of less than $100,000 with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$48,320	$48,320	$0	0.00%	$7,624	$7,624	$0	0.00%
Minimum	$15,560	$19,372	-$6,333	24.50%	-$10,968	-$8,930	-$6,333	18.58%
Maximum	$82,102	$76,998	$14,298	-6.22%	$29,156	$27,467	$14,298	-5.79%
Average Std Deviation	$18,507	$13,832	-$4,675	-25.26%	$12,967	$11,738	-$1,229	-9.48%
Minimum	$6,509	$3,001	-$12,915	-53.91%	$5,076	$3,177	-$6,327	-37.42%
Maximum	$38,525	$32,093	-$184	-16.70%	$21,761	$18,788	$9,205	-13.66%
Average CV[1]	0.41	0.29	-0.12	-30.38%	1.08	1.41	0.33	30.53%
Minimum	0.14	0.09	-0.73	-37.77%	0.54	0.51	-0.75	-6.69%
Maximum	1.41	0.72	0.03	-48.81%	2.74	8.19	5.45	198.79%
Average Minimum	$25,158	$32,882	$7,725	30.71%	-$11,038	-$9,265	$1,773	16.07%
Minimum	-$1,341	$13,910	-$4,737	1137.47%	-$34,758	-$36,465	-$8,067	-4.91%
Maximum	$56,241	$59,042	$23,227	4.98%	$10,404	$4,931	$16,093	-52.60%
Average Maximum	$75,919	$70,914	-$5,005	-6.59%	$25,967	$24,203	-$1,763	-6.79%
Minimum	$25,147	$24,332	-$8,564	-3.24%	-$2,300	-$4,779	-$8,564	-107.77%
Maximum	$127,361	$122,774	-$815	-3.60%	$53,895	$49,112	$24,215	-8.87%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 21 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.43 Summary statistics for 49 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$130,301	$130,301	$0	0.00%	$31,381	$31,381	$0	0.00%
Minimum	$42,548	$42,548	$0	0.00%	-$5,589	-$5,589	$0	0.00%
Maximum	$210,642	$210,642	$0	0.00%	$84,457	$84,457	$0	0.00%
Average Std Deviation	$44,214	$36,070	-$8,144	-18.42%	$28,500	$24,698	-$3,803	-13.34%
Minimum	$13,058	$11,811	-$27,505	-9.55%	$10,550	$10,152	-$19,428	-3.77%
Maximum	$103,254	$90,987	$6,328	-11.88%	$57,201	$48,571	$16,902	-15.09%
Average CV[1]	0.35	0.28	-0.07	-19.49%	2.54	2.32	-0.22	-8.58%
Minimum	0.16	0.12	-0.28	-22.75%	0.22	0.23	-3.73	3.49%
Maximum	0.63	0.58	0.10	-8.00%	35.28	34.52	2.07	-2.18%
Average Minimum	$66,041	$87,754	$21,713	32.88%	-$9,480	-$1,141	$8,339	87.96%
Minimum	$984	$18,499	-$13,416	1780.77%	-$87,553	-$51,591	-$15,348	41.07%
Maximum	$152,200	$156,526	$59,500	2.84%	$62,800	$59,182	$57,044	-5.76%
Average Maximum	$191,217	$185,119	-$6,097	-3.19%	$72,545	$68,341	-$4,204	-5.80%
Minimum	$79,215	$76,797	-$23,424	-3.05%	$20,367	$21,017	-$22,413	3.19%
Maximum	$301,725	$301,725	$13,381	0.00%	$156,594	$147,087	$20,247	-6.07%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 48 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.44 Summary by frequency of claim for 49 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	5	0.00%	$0	$7,940	$8,955	$97,634	$7,486	$0
1	16	4.59%	$3,966	$7,023	$7,921	$86,357	$6,563	$27,760
2	11	7.01%	$5,352	$6,213	$7,007	$76,391	$7,383	$18,731
3	11	11.56%	$10,941	$7,701	$8,685	$94,685	$14,314	$25,530
4	3	17.73%	$17,512	$8,031	$9,058	$98,751	$14,799	$30,646
5	2	17.36%	$16,013	$7,504	$8,463	$92,268	$24,126	$22,418
6	0	-	-	-	-	-	-	-
7	1	30.52%	$23,156	$6,171	$6,959	$75,874	$14,621	$23,156

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (8.13%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (9.17%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.45 Summary statistics for 44 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$125,575	$125,575	$0	0.00%	$30,528	$30,528	$0	0.00%
Minimum	$42,548	$42,548	$0	0.00%	-$5,589	-$5,589	$0	0.00%
Maximum	$197,059	$197,059	$0	0.00%	$84,457	$84,457	$0	0.00%
Average Std Deviation	$43,961	$34,891	-$9,069	-20.63%	$28,097	$23,862	-$4,235	-15.07%
Minimum	$13,058	$11,811	-$27,505	-9.55%	$10,550	$10,152	-$19,428	-3.77%
Maximum	$103,254	$90,987	$6,328	-11.88%	$57,201	$48,081	$16,902	-15.94%
Average CV[1]	0.36	0.28	-0.08	-21.14%	2.68	2.43	-0.24	-9.07%
Minimum	0.17	0.12	-0.28	-25.75%	0.22	0.23	-3.73	3.49%
Maximum	0.63	0.58	0.10	-8.00%	35.28	34.52	2.07	-2.18%
Average Minimum	$60,277	$84,457	$24,181	40.12%	-$9,762	-$476	$9,286	95.12%
Minimum	$984	$18,499	-$13,416	1780.77%	-$87,553	-$45,162	-$15,348	48.42%
Maximum	$152,200	$156,526	$59,500	2.84%	$62,800	$59,182	$57,044	-5.76%
Average Maximum	$185,114	$178,324	-$6,790	-3.67%	$71,717	$67,035	-$4,682	-6.53%
Minimum	$79,215	$76,797	-$23,424	-3.05%	$20,367	$21,017	-$22,413	3.19%
Maximum	$301,677	$291,093	$13,381	-3.51%	$156,594	$147,087	$20,247	-6.07%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 43 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.46 Summary statistics for 49 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$130,301	$130,301	$0	0.00%	$31,381	$31,381	$0	0.00%
Minimum	$42,548	$59,534	-$8,755	39.92%	-$5,589	-$3,891	-$8,755	30.37%
Maximum	$210,642	$202,125	$17,055	-4.04%	$84,457	$85,892	$17,055	1.70%
Average Std Deviation	$44,214	$36,288	-$7,927	-17.93%	$28,500	$24,655	-$3,846	-13.49%
Minimum	$13,058	$12,701	-$25,605	-2.74%	$10,550	$10,203	-$20,173	-3.28%
Maximum	$103,254	$91,754	$4,854	-11.14%	$57,201	$48,437	$15,906	-15.32%
Average CV[1]	0.35	0.28	-0.07	-20.37%	1.71	1.64	-0.08	-4.58%
Minimum	0.16	0.13	-0.31	-18.05%	0.22	0.17	-6.26	-22.33%
Maximum	0.63	0.56	0.04	-11.98%	10.42	15.11	11.00	45.02%
Average Minimum	$66,041	$87,718	$21,678	32.82%	-$9,480	-$1,015	$8,465	89.29%
Minimum	$984	$35,856	-$8,929	3545.39%	-$87,553	-$60,632	-$11,600	30.75%
Maximum	$152,200	$149,078	$67,390	-2.05%	$62,800	$52,795	$58,693	-15.93%
Average Maximum	$191,217	$185,427	-$5,789	-3.03%	$72,545	$68,357	-$4,188	-5.77%
Minimum	$79,215	$92,313	-$11,393	16.54%	$20,367	$23,779	-$11,393	16.75%
Maximum	$301,725	$295,226	$20,571	-2.15%	$156,594	$148,635	$32,143	-5.08%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 46 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.47 Summary statistics for 44 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$125,575	$126,477	$902	0.72%	$30,528	$31,431	$902	2.96%
Minimum	$42,548	$59,534	-$7,489	39.92%	-$5,589	-$3,891	-$7,489	30.37%
Maximum	$197,059	$192,440	$17,055	-2.34%	$84,457	$85,892	$17,055	1.70%
Average Std Deviation	$43,961	$35,152	-$8,808	-20.04%	$28,097	$23,838	-$4,258	-15.16%
Minimum	$13,058	$12,701	-$25,605	-2.74%	$10,550	$10,203	-$20,173	-3.28%
Maximum	$103,254	$91,754	$4,854	-11.14%	$57,201	$47,709	$15,906	-16.59%
Average CV[1]	0.36	0.28	-0.08	-22.47%	1.76	1.39	-0.37	-20.99%
Minimum	0.17	0.13	-0.31	-21.23%	0.22	0.17	-6.26	-22.33%
Maximum	0.63	0.56	0.04	-11.98%	10.42	13.94	4.28	33.82%
Average Minimum	$60,277	$85,291	$25,014	41.50%	-$9,762	$559	$10,322	105.73%
Minimum	$984	$35,856	-$3,933	3545.39%	-$87,553	-$46,843	-$11,600	46.50%
Maximum	$152,200	$149,078	$67,390	-2.05%	$62,800	$52,795	$58,693	-15.93%
Average Maximum	$185,114	$179,563	-$5,551	-3.00%	$71,717	$68,003	-$3,714	-5.18%
Minimum	$79,215	$92,313	-$11,393	16.54%	$20,367	$23,779	-$11,393	16.75%
Maximum	$301,677	$295,226	$20,571	-2.14%	$156,594	$148,635	$32,143	-5.08%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 41 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.48 Summary statistics for 49 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$130,301	$129,387	-$914	-0.70%	$31,381	$30,468	-$914	-2.91%
Minimum	$42,548	$58,745	-$9,873	38.07%	-$5,589	-$4,576	-$9,873	18.12%
Maximum	$210,642	$201,037	$16,241	-4.56%	$84,457	$84,861	$16,241	0.48%
Average Std Deviation	$44,214	$36,317	-$7,898	-17.86%	$28,500	$24,652	-$3,848	-13.50%
Minimum	$13,058	$12,817	-$25,358	-1.84%	$10,550	$10,139	-$20,237	-3.90%
Maximum	$103,254	$91,852	$4,669	-11.04%	$57,201	$48,421	$15,779	-15.35%
Average CV[1]	0.35	0.28	-0.07	-19.75%	1.71	2.19	0.47	27.60%
Minimum	0.16	0.13	-0.31	-17.21%	0.22	0.17	-5.29	-21.17%
Maximum	0.63	0.56	0.04	-11.41%	10.42	24.08	18.92	131.20%
Average Minimum	$66,041	$86,788	$20,747	31.42%	-$9,480	-$1,913	$7,567	79.82%
Minimum	$984	$35,115	-$10,070	3470.05%	-$87,553	-$61,787	-$13,083	29.43%
Maximum	$152,200	$147,567	$66,617	-3.04%	$62,800	$51,516	$57,689	-17.97%
Average Maximum	$191,217	$184,554	-$6,663	-3.48%	$72,545	$67,453	-$5,092	-7.02%
Minimum	$79,215	$91,337	-$12,849	15.30%	$20,367	$22,922	-$12,849	12.55%
Maximum	$301,725	$294,402	$19,529	-2.43%	$156,594	$147,618	$31,167	-5.73%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 46 farms remained for NFI CV analysis.

Note: Adusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.49 Summary statistics for 44 SE Kansas crop farms with Value of Farm Production (VFP) of $100,000 to $249,999 with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$125,575	$125,575	$0	0.00%	$30,528	$30,528	$0	0.00%
Minimum	$42,548	$58,745	-$8,689	38.07%	-$5,589	-$4,576	-$8,689	18.12%
Maximum	$197,059	$191,401	$16,241	-2.87%	$84,457	$84,861	$16,241	0.48%
Average Std Deviation	$43,961	$35,187	-$8,773	-19.96%	$28,097	$23,838	-$4,258	-15.16%
Minimum	$13,058	$12,817	-$25,358	-1.84%	$10,550	$10,139	-$20,237	-3.90%
Maximum	$103,254	$91,852	$4,669	-11.04%	$57,201	$47,663	$15,779	-16.67%
Average CV[1]	0.36	0.28	-0.08	-21.85%	1.76	1.82	0.05	3.05%
Minimum	0.17	0.13	-0.31	-20.42%	0.22	0.17	-5.29	-21.17%
Maximum	0.63	0.56	0.04	-11.41%	10.42	24.08	14.43	131.20%
Average Minimum	$60,277	$84,366	$24,089	39.96%	-$9,762	-$326	$9,436	96.66%
Minimum	$984	$35,115	-$4,864	3470.05%	-$87,553	-$48,059	-$13,083	45.11%
Maximum	$152,200	$147,567	$66,617	-3.04%	$62,800	$51,516	$57,689	-17.97%
Average Maximum	$185,114	$178,704	-$6,410	-3.46%	$71,717	$67,116	-$4,600	-6.41%
Minimum	$79,215	$91,337	-$12,849	15.30%	$20,367	$22,922	-$12,849	12.55%
Maximum	$301,677	$294,402	$19,529	-2.41%	$156,594	$147,618	$31,167	-5.73%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 41 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.50 Summary statistics for 38 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$291,674	$291,674	$0	0.00%	$73,546	$73,546	$0	0.00%
Minimum	$138,744	$138,744	$0	0.00%	-$140	-$140	$0	0.00%
Maximum	$563,674	$563,674	$0	0.00%	$221,836	$221,836	$0	0.00%
Average Std Deviation	$110,022	$97,440	-$12,582	-11.44%	$70,176	$62,107	-$8,069	-11.50%
Minimum	$26,531	$25,083	-$57,563	-5.46%	$18,572	$17,186	-$31,349	-7.46%
Maximum	$254,595	$238,588	$0	-6.29%	$180,551	$169,506	$0	-6.12%
Average CV[1]	0.37	0.33	-0.04	-11.62%	1.36	1.18	-0.18	-13.11%
Minimum	0.09	0.09	-0.18	0.00%	0.29	0.27	-0.96	-7.46%
Maximum	0.68	0.67	0.00	-1.02%	6.76	5.80	0.00	-14.27%
Average Minimum	$149,621	$178,842	$29,221	19.53%	-$21,010	-$2,296	$18,714	89.07%
Minimum	$51,940	$60,501	-$5,150	16.48%	-$148,408	-$110,881	-$9,968	25.29%
Maximum	$248,863	$269,713	$112,808	8.38%	$129,829	$129,829	$82,356	0.00%
Average Maximum	$453,063	$442,697	-$10,367	-2.29%	$181,553	$174,041	-$7,512	-4.14%
Minimum	$228,266	$218,164	-$41,508	-4.43%	$73,002	$58,554	-$35,628	-19.79%
Maximum	$940,066	$931,517	$0	-0.91%	$484,797	$476,248	$38,922	-1.76%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 37 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.51 Summary by frequency of claim for 38 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	5	0.00%	$0	$7,908	$8,791	$136,219	$12,785	$0
1	16	3.09%	$5,260	$9,894	$10,998	$170,423	$16,165	$36,820
2	10	6.80%	$12,186	$10,407	$11,569	$179,261	$19,936	$42,652
3	5	10.05%	$22,379	$12,934	$14,377	$222,783	$23,427	$52,219
4	2	16.14%	$38,009	$13,671	$15,196	$235,476	$26,999	$66,516
5	0	-	-	-	-	-	-	-
6	0	-	-	-	-	-	-	-
7	0	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (5.81%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (6.45%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.52 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$292,904	$292,904	$0	0.00%	$73,115	$73,115	$0	0.00%
Minimum	$138,744	$138,744	$0	0.00%	-$140	-$140	$0	0.00%
Maximum	$563,674	$563,674	$0	0.00%	$186,703	$186,703	$0	0.00%
Average Std Deviation	$114,526	$100,038	-$14,489	-12.65%	$73,380	$64,088	-$9,292	-12.66%
Minimum	$26,531	$25,083	-$57,563	-5.46%	$18,572	$17,186	-$31,349	-7.46%
Maximum	$254,595	$238,588	-$82	-6.29%	$180,551	$169,506	-$99	-6.12%
Average CV[1]	0.38	0.33	-0.05	-12.91%	1.40	1.19	-0.21	-14.73%
Minimum	0.12	0.11	-0.18	-5.46%	0.29	0.27	-0.96	-7.46%
Maximum	0.68	0.67	0.00	-1.02%	6.76	5.80	0.00	-14.27%
Average Minimum	$145,451	$179,099	$33,649	23.13%	-$26,392	-$4,843	$21,550	81.65%
Minimum	$51,940	$60,501	-$5,150	16.48%	-$148,408	-$110,881	-$9,968	25.29%
Maximum	$248,863	$269,713	$112,808	8.38%	$64,569	$83,158	$82,356	28.79%
Average Maximum	$463,849	$451,912	-$11,937	-2.57%	$186,979	$178,328	-$8,650	-4.63%
Minimum	$228,266	$218,164	-$41,508	-4.43%	$73,002	$58,554	-$35,628	-19.79%
Maximum	$940,066	$931,517	-$53	-0.91%	$484,797	$476,248	$38,922	-1.76%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 32 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.53 Summary statistics for 38 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$291,674	$291,674	$0	0.00%	$73,546	$73,546	$0	0.00%
Minimum	$138,744	$134,564	-$10,000	-3.01%	-$140	$13,297	-$10,000	9569.22%
Maximum	$563,674	$557,368	$28,028	-1.12%	$221,836	$214,392	$28,028	-3.36%
Average Std Deviation	$110,022	$97,528	-$12,493	-11.36%	$70,176	$62,041	-$8,135	-11.59%
Minimum	$26,531	$25,038	-$56,876	-5.63%	$18,572	$17,531	-$31,250	-5.61%
Maximum	$254,595	$239,048	-$285	-6.11%	$180,551	$166,794	-$70	-7.62%
Average CV[1]	0.37	0.33	-0.04	-11.45%	1.36	1.10	-0.26	-19.15%
Minimum	0.09	0.10	-0.20	1.97%	0.29	0.30	-4.84	1.62%
Maximum	0.68	0.68	0.01	0.12%	6.76	3.79	1.39	-43.87%
Average Minimum	$149,621	$179,372	$29,751	19.88%	-$21,010	-$1,793	$19,217	91.46%
Minimum	$51,940	$57,388	-$10,473	10.49%	-$148,408	-$98,159	-$14,501	33.86%
Maximum	$248,863	$261,181	$140,380	4.95%	$129,829	$123,190	$91,306	-5.11%
Average Maximum	$453,063	$443,176	-$9,888	-2.18%	$181,553	$174,149	-$7,405	-4.08%
Minimum	$228,266	$223,614	-$14,522	-2.04%	$73,002	$66,241	-$21,281	-9.26%
Maximum	$940,066	$930,101	-$4,652	-1.06%	$484,797	$463,516	$66,113	-4.39%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 37 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.54 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$292,904	$294,102	$1,198	0.41%	$73,115	$74,313	$1,198	1.64%
Minimum	$138,744	$134,564	-$10,000	-3.01%	-$140	$18,272	-$10,000	13111.68%
Maximum	$563,674	$557,368	$28,028	-1.12%	$186,703	$181,530	$28,028	-2.77%
Average Std Deviation	$114,526	$100,212	-$14,315	-12.50%	$73,380	$64,052	-$9,327	-12.71%
Minimum	$26,531	$25,038	-$56,876	-5.63%	$18,572	$17,531	-$31,250	-5.61%
Maximum	$254,595	$239,048	-$409	-6.11%	$180,551	$166,794	-$358	-7.62%
Average CV[1]	0.38	0.33	-0.05	-12.97%	1.40	1.03	-0.37	-26.14%
Minimum	0.12	0.11	-0.20	-1.90%	0.29	0.30	-4.84	1.62%
Maximum	0.68	0.68	0.01	0.12%	6.76	1.97	0.44	-70.87%
Average Minimum	$145,451	$180,785	$35,334	24.29%	-$26,392	-$3,182	$23,211	87.95%
Minimum	$51,940	$57,388	-$10,473	10.49%	-$148,408	-$98,159	-$14,501	33.86%
Maximum	$248,863	$261,181	$140,380	4.95%	$64,569	$90,105	$91,306	39.55%
Average Maximum	$463,849	$453,743	-$10,106	-2.18%	$186,979	$179,668	-$7,311	-3.91%
Minimum	$228,266	$223,614	-$14,522	-2.04%	$73,002	$66,241	-$21,281	-9.26%
Maximum	$940,066	$930,101	-$4,652	-1.06%	$484,797	$463,516	$66,113	-4.39%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 32 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.55 Summary statistics for 38 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$291,674	$290,517	-$1,157	-0.40%	$73,546	$72,389	-$1,157	-1.57%
Minimum	$138,744	$134,092	-$11,503	-3.35%	-$140	$12,426	-$11,503	8948.96%
Maximum	$563,674	$555,711	$26,524	-1.41%	$221,836	$213,561	$26,524	-3.73%
Average Std Deviation	$110,022	$97,539	-$12,482	-11.35%	$70,176	$62,035	-$8,141	-11.60%
Minimum	$26,531	$25,034	-$56,799	-5.64%	$18,572	$17,569	-$31,237	-5.40%
Maximum	$254,595	$239,105	-$317	-6.08%	$180,551	$166,496	-$78	-7.78%
Average CV[1]	0.37	0.33	-0.04	-11.10%	1.36	1.13	-0.23	-16.59%
Minimum	0.09	0.10	-0.20	2.20%	0.29	0.30	-4.74	2.63%
Maximum	0.68	0.68	0.01	0.33%	6.76	4.06	1.65	-39.98%
Average Minimum	$149,621	$178,275	$28,654	19.15%	-$21,010	-$2,899	$18,111	86.20%
Minimum	$51,940	$57,034	-$11,641	9.81%	-$148,408	-$99,174	-$16,119	33.17%
Maximum	$248,863	$259,523	$138,825	4.28%	$129,829	$122,450	$90,418	-5.68%
Average Maximum	$453,063	$442,075	-$10,989	-2.43%	$181,553	$173,004	-$8,549	-4.71%
Minimum	$228,266	$223,095	-$16,143	-2.27%	$73,002	$64,907	-$23,655	-11.09%
Maximum	$940,066	$928,989	-$5,171	-1.18%	$484,797	$461,142	$64,516	-4.88%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 37 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.56 Summary statistics for 33 SE Kansas crop farms with Value of Farm Production (VFP) of $250,000 to $500,000 with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$292,904	$292,904	$0	0.00%	$73,115	$73,115	$0	0.00%
Minimum	$138,744	$134,092	-$11,503	-3.35%	-$140	$17,056	-$11,503	12245.39%
Maximum	$563,674	$555,711	$26,524	-1.41%	$186,703	$180,636	$26,524	-3.25%
Average Std Deviation	$114,526	$100,232	-$14,294	-12.48%	$73,380	$64,050	-$9,330	-12.71%
Minimum	$26,531	$25,034	-$56,799	-5.64%	$18,572	$17,569	-$31,237	-5.40%
Maximum	$254,595	$239,105	-$446	-6.08%	$180,551	$166,496	-$377	-7.78%
Average CV[1]	0.38	0.33	-0.05	-12.61%	1.40	1.06	-0.34	-24.07%
Minimum	0.12	0.11	-0.20	-1.37%	0.29	0.30	-4.74	2.63%
Maximum	0.68	0.68	0.01	0.33%	6.76	2.04	0.56	-69.81%
Average Minimum	$145,451	$179,641	$34,190	23.51%	-$26,392	-$4,334	$22,058	83.58%
Minimum	$51,940	$57,034	-$11,641	9.81%	-$148,408	-$99,174	-$16,119	33.17%
Maximum	$248,863	$259,523	$138,825	4.28%	$64,569	$88,861	$90,418	37.62%
Average Maximum	$463,849	$452,616	-$11,234	-2.42%	$186,979	$178,485	-$8,494	-4.54%
Minimum	$228,266	$223,095	-$16,143	-2.27%	$73,002	$64,907	-$23,655	-11.09%
Maximum	$940,066	$928,989	-$5,171	-1.18%	$484,797	$461,142	$64,516	-4.88%

[1]Coefficient of variation (CV) results for NFI includes only those farms with positive values. Negative values provide no economic interpretation. Therefore following elimination of negative observations 32 farms remained for NFI CV analysis.

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.57 Summary statistics for 6 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$831,791	$831,791	$0	0.00%	$197,236	$197,236	$0	0.00%
Minimum	$463,960	$463,960	$0	0.00%	$101,080	$101,080	$0	0.00%
Maximum	$1,034,902	$1,034,902	$0	0.00%	$264,961	$264,961	$0	0.00%
Average Std Deviation	$330,623	$314,493	-$16,130	-4.88%	$165,742	$151,268	-$14,473	-8.73%
Minimum	$199,883	$186,544	-$47,447	-6.67%	$83,733	$83,733	-$62,315	0.00%
Maximum	$529,292	$481,845	$0	-8.96%	$250,775	$237,850	$0	-5.15%
Average CV	0.40	0.38	-0.02	-5.00%	0.92	0.84	-0.08	-8.72%
Minimum	0.29	0.28	-0.05	-4.82%	0.32	0.32	-0.32	0.00%
Maximum	0.54	0.49	0.00	-8.96%	1.56	1.49	0.00	-4.35%
Average Minimum	$412,797	$468,010	$55,214	13.38%	-$22,330	$5,636	$27,966	125.24%
Minimum	$161,979	$318,433	$0	96.59%	-$313,879	-$147,879	-$20,333	52.89%
Maximum	$729,900	$729,900	$166,000	0.00%	$168,481	$168,481	$166,000	0.00%
Average Maximum	$1,321,228	$1,309,955	-$11,273	-0.85%	$461,790	$450,516	-$11,273	-2.44%
Minimum	$829,752	$816,078	-$27,667	-1.65%	$381,777	$381,777	-$27,667	0.00%
Maximum	$1,708,403	$1,680,736	$0	-1.62%	$686,230	$686,230	$0	0.00%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.58 Summary by frequency of claim for 6 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 assuming AFPF, AFAR, and AFARI

Years With Indemnity	Number of Farms	Average Premium Rate[1]	Average AFPF Premium Paid[2]	Average AFAR Premium Paid[3]	Average AFARI Premium Paid[4]	Average Liability[5]	Mean Standard Deviation of Liability[6]	Average Indemnity/Farm/ Year[7]
0	2	0.00%	$0	$12,596	$20,072	$500,052	$47,187	$0
1	2	3.78%	$16,817	$11,197	$17,842	$444,507	$43,581	$117,717
2	1	4.17%	$20,333	$12,274	$19,558	$487,255	$37,333	$71,165
3	1	4.43%	$13,674	$7,780	$12,397	$308,847	$15,064	$31,905
4	0	-	-	-	-	-	-	-
5	0	-	-	-	-	-	-	-
6	0	-	-	-	-	-	-	-
7	0	-	-	-	-	-	-	-

[1]Average premium rate reflects the average premium rate calculated by dividing total indemnities by total liabilities for each frequency of indemnity

[2]Average Actuarially Fair Premium by Farm (AFPF) premium paid reflects the average paid premium resulting from AFPF such that premiums equal indemnities

[3]Average Actuarially Fair Average Rate (AFAR) premium paid reflects the average paid premium by all farms resulting from AFAR (2.52%)

[4]Average Actuarially Fair Average Rate for farms with Indemnities (AFARI) premium paid reflects the average paid premium by all farms resulting from AFARI (4.01%)

[5]Average liability was computed by averaging the liability across farms for each frequency of claim

[6]Mean standard deviation of liability was calculated by taking the average of the standard deviation of liability by farm

[7]Average indemnity per farm per year was calculated using the following formula: (((sum of indemnities)/(number of farms))/ years with indemnity)

Table 4.59 Summary statistics for 4 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 with at least one claim assuming Actuarially Fair Premium by Farm (AFPF)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$775,482	$775,482	$0	0.00%	$167,011	$167,011	$0	0.00%
Minimum	$463,960	$463,960	$0	0.00%	$101,080	$101,080	$0	0.00%
Maximum	$988,138	$988,138	$0	0.00%	$197,331	$197,331	$0	0.00%
Average Std Deviation	$323,702	$299,508	-$24,194	-7.47%	$168,217	$146,507	-$21,710	-12.91%
Minimum	$199,883	$186,544	-$47,447	-6.67%	$122,971	$111,408	-$62,315	-9.40%
Maximum	$529,292	$481,845	-$10,827	-8.96%	$250,775	$188,460	-$6,099	-24.85%
Average CV	0.41	0.38	-0.03	-7.26%	1.07	0.95	-0.12	-11.29%
Minimum	0.29	0.28	-0.05	-4.82%	0.62	0.56	-0.32	-9.40%
Maximum	0.54	0.49	-0.01	-8.96%	1.56	1.49	-0.03	-4.35%
Average Minimum	$330,482	$413,302	$82,820	25.06%	-$75,925	-$33,976	$41,948	55.25%
Minimum	$161,979	$318,433	$35,800	96.59%	-$313,879	-$147,879	-$20,333	52.89%
Maximum	$482,838	$554,192	$166,000	14.78%	$70,438	$50,105	$166,000	-28.87%
Average Maximum	$1,236,868	$1,219,958	-$16,910	-1.37%	$425,683	$408,773	-$16,910	-3.97%
Minimum	$829,752	$816,078	-$27,667	-1.65%	$406,998	$386,665	-$27,667	-5.00%
Maximum	$1,708,403	$1,680,736	-$5,967	-1.62%	$434,536	$421,019	-$5,967	-3.11%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.60 Summary statistics for 6 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$831,791	$831,791	$0	0.00%	$197,236	$197,236	$0	0.00%
Minimum	$463,960	$469,854	-$16,376	1.27%	$101,080	$95,656	-$16,376	-5.37%
Maximum	$1,034,902	$1,018,525	$16,664	-1.58%	$264,961	$256,145	$16,664	-3.33%
Average Std Deviation	$330,623	$314,213	-$16,409	-4.96%	$165,742	$150,879	-$14,863	-8.97%
Minimum	$199,883	$186,641	-$48,657	-6.62%	$83,733	$83,372	-$63,447	-0.43%
Maximum	$529,292	$480,636	-$401	-9.19%	$250,775	$237,044	-$361	-5.48%
Average CV	0.40	0.38	-0.02	-5.28%	0.92	0.85	-0.08	-8.25%
Minimum	0.29	0.28	-0.06	-4.23%	0.32	0.33	-0.41	3.00%
Maximum	0.54	0.48	0.00	-10.70%	1.56	1.58	0.06	0.93%
Average Minimum	$412,797	$468,669	$55,872	13.54%	-$22,330	$6,886	$29,216	130.84%
Minimum	$161,979	$324,396	-$15,670	100.27%	-$313,879	-$128,762	-$12,994	58.98%
Maximum	$729,900	$714,230	$185,117	-2.15%	$168,481	$160,463	$185,117	-4.76%
Average Maximum	$1,321,228	$1,309,348	-$11,880	-0.90%	$461,790	$449,891	-$11,899	-2.58%
Minimum	$829,752	$821,773	-$16,734	-0.96%	$381,777	$371,848	-$17,938	-2.60%
Maximum	$1,708,403	$1,695,774	-$7,979	-0.74%	$686,230	$668,292	-$7,979	-2.61%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.61 Summary statistics for 4 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 with at least one claim assuming Actuarially Fair Average Rate (AFAR)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$775,482	$781,780	$6,298	0.81%	$167,011	$173,309	$6,298	3.77%
Minimum	$463,960	$469,854	-$5,424	1.27%	$101,080	$95,656	-$5,424	-5.37%
Maximum	$988,138	$1,004,801	$16,664	1.69%	$197,331	$209,771	$16,664	6.30%
Average Std Deviation	$323,702	$299,291	-$24,411	-7.54%	$168,217	$146,215	-$22,002	-13.08%
Minimum	$199,883	$186,641	-$48,657	-6.62%	$122,971	$111,588	-$63,447	-9.26%
Maximum	$529,292	$480,636	-$11,008	-9.19%	$250,775	$187,327	-$6,101	-25.30%
Average CV	0.41	0.38	-0.03	-8.19%	1.07	0.94	-0.13	-12.38%
Minimum	0.29	0.28	-0.06	-4.23%	0.62	0.54	-0.41	-12.82%
Maximum	0.54	0.48	-0.01	-10.70%	1.56	1.58	0.01	0.93%
Average Minimum	$330,482	$420,212	$89,730	27.15%	-$75,925	-$26,848	$49,076	64.64%
Minimum	$161,979	$324,396	$31,265	100.27%	-$313,879	-$128,762	-$12,087	58.98%
Maximum	$482,838	$561,286	$185,117	16.25%	$70,438	$58,351	$185,117	-17.16%
Average Maximum	$1,236,868	$1,225,714	-$11,155	-0.90%	$425,683	$414,801	-$10,882	-2.56%
Minimum	$829,752	$821,773	-$12,629	-0.96%	$406,998	$394,323	-$12,675	-3.11%
Maximum	$1,708,403	$1,695,774	-$7,979	-0.74%	$434,536	$426,557	-$7,979	-1.84%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.62 Summary statistics for 6 SE Kansas crop farms with Value of Farm Production (VFP) of greater than $500,000 assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$831,791	$825,100	-$6,691	-0.80%	$197,236	$190,545	-$6,691	-3.39%
Minimum	$463,960	$465,237	-$26,095	0.28%	$101,080	$88,895	-$26,095	-12.05%
Maximum	$1,034,902	$1,008,806	$10,133	-2.52%	$264,961	$250,913	$10,133	-5.30%
Average Std Deviation	$330,623	$314,049	-$16,574	-5.01%	$165,742	$150,650	-$15,091	-9.11%
Minimum	$199,883	$186,700	-$49,374	-6.60%	$83,733	$83,159	-$64,118	-0.69%
Maximum	$529,292	$479,918	-$634	-9.33%	$250,775	$236,571	-$574	-5.66%
Average CV	0.40	0.38	-0.02	-4.56%	0.92	0.89	-0.04	-4.08%
Minimum	0.29	0.28	-0.05	-3.43%	0.32	0.33	-0.38	4.88%
Maximum	0.54	0.48	0.01	-10.25%	1.56	1.69	0.13	8.52%
Average Minimum	$412,797	$462,361	$49,564	12.01%	-$22,330	$937	$23,267	104.20%
Minimum	$161,979	$319,821	-$24,969	97.45%	-$313,879	-$133,837	-$20,706	57.36%
Maximum	$729,900	$704,931	$180,042	-3.42%	$168,481	$155,705	$180,042	-7.58%
Average Maximum	$1,321,228	$1,302,297	-$18,931	-1.43%	$461,790	$442,829	-$18,961	-4.11%
Minimum	$829,752	$817,038	-$26,666	-1.53%	$381,777	$365,956	-$28,585	-4.14%
Maximum	$1,708,403	$1,688,278	-$12,714	-1.18%	$686,230	$657,645	-$12,714	-4.17%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.63 Summary statistics for 4 SE Kansas crop farms with value of farm production (VFP) of greater than $500,000 with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Average AGRC Change	AGRC Percent Change	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Average NFI Change	NFI Percent Change
Average Mean	$775,482	$775,482	$0	0.00%	$167,011	$167,011	$0	0.00%
Minimum	$463,960	$465,237	-$12,185	0.28%	$101,080	$88,895	-$12,185	-12.05%
Maximum	$988,138	$998,271	$10,133	1.03%	$197,331	$203,241	$10,133	2.99%
Average Std Deviation	$323,702	$299,163	-$24,539	-7.58%	$168,217	$146,043	-$22,174	-13.18%
Minimum	$199,883	$186,700	-$49,374	-6.60%	$122,971	$111,699	-$64,118	-9.17%
Maximum	$529,292	$479,918	-$11,114	-9.33%	$250,775	$186,656	-$6,102	-25.57%
Average CV	0.41	0.38	-0.03	-7.45%	1.07	0.98	-0.09	-8.09%
Minimum	0.29	0.28	-0.05	-3.43%	0.62	0.56	-0.38	-9.52%
Maximum	0.54	0.48	-0.01	-10.25%	1.56	1.69	0.13	8.52%
Average Minimum	$330,482	$414,264	$83,783	25.35%	-$75,925	-$32,654	$43,271	56.99%
Minimum	$161,979	$319,821	$25,033	97.45%	-$313,879	-$133,837	-$19,260	57.36%
Maximum	$482,838	$553,379	$180,042	14.61%	$70,438	$51,178	$180,042	-27.34%
Average Maximum	$1,236,868	$1,219,093	-$17,775	-1.44%	$425,683	$408,343	-$17,340	-4.07%
Minimum	$829,752	$817,038	-$20,125	-1.53%	$406,998	$386,801	-$20,197	-4.96%
Maximum	$1,708,403	$1,688,278	-$12,714	-1.18%	$434,536	$421,822	-$12,714	-2.93%

Note: Adjusted Gross Revenue to Count (AGRC), Net Farm Income (NFI)

Table 4.64 Summary statistics of rates and premiums for SE Kansas farms by farm category

	Dairy	Beef	Livestock	Crop	Total
Total Number of Farms	13	64	93	126	219
AFPF[a]	$4,926	$6,773	$6,621	$8,778	$8,224
AFAR[b]	0.70%	3.06%	2.41%	6.24%	4.54%
Average Premium[c]	$1,516	$3,493	$3,275	$7,454	$5,745
Average Premium with claims[d]	$1,837	$3,444	$3,047	$7,358	$5,474
AFARI[e]	1.88%	6.01%	5.23%	7.45%	6.82%
Average Premium[f]	$4,064	$6,869	$7,117	$8,892	$8,632
Average Premium with claims[g]	$4,926	$6,773	$6,621	$8,778	$8,224
Average Liability	$216,084	$114,337	$136,141	$119,435	$126,477
Number of Farms with claims[h]	4	33	46	107	153
	(30.77)	(51.56)	(49.46)	(84.92)	(69.86)
Average Indemnity[i]	$19,703	$23,707	$22,924	$27,056	$26,213
Frequency of claims[j]	1.75	2.00	2.02	2.27	2.20
	(25.00)	(28.57)	(28.88)	(32.44)	(31.37)

[a]Actuarially Fair Premium by Farm (AFPF) averages farms which paid a premium excluding farms with zero premiums

[b]Actuairally Fair Average Rate (AFAR) was calculated by dividing total indemnities by total liabilities including all farms within the category

[c]Average premium calculates the average paid premium resulting from AFAR

[d]Average Premium with claims is the average paid premium, assuming AFAR, using solely farms which received a minimum of one indemnity over the seven year period

[e]Actuarially Fair Average Rate for farms with Indemnities (AFARI) is the average rate computed using farms which genearted a minimum of one indemnity over the seven year period

[f]Average premium calculates the average premium paid resulting from the applied AFARI from all farms

[g]Average premium with claims is the average paid premium, assuming AFARI, using solely farms which generated a minimum of one indemnity over the seven year period

[h]Number of farms with claims presents the number of farms from the total which generated a minimum of one claim over the seven year period with percentages reported in parentheses below

[i]Average indemnity computes the average indeminty for farms which received a minimum of one indemnity over the seven year period

[j]Frequency of claims reflects the average number of claims each category generated excluding farms with zero claims with percentages in parentheses below

Table 4.65 Summary statistics of rates and premiums for SE Kansas crop farms by Value of Farm Production (VFP)

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
Total Number of Farms	33	49	38	6
AFPF[a]	$5,393	$7,963	$11,937	$16,910
AFAR[b]	11.04%	8.13%	5.81%	2.52%
Average Premium[c]	$4,249	$7,151	$10,367	$11,273
Average Premium with claims[d]	$4,272	$7,061	$10,739	$10,612
AFARI[e]	13.93%	9.17%	6.45%	4.01%
Average Premium[f]	$5,364	$8,065	$11,523	$17,964
Average Premium with claims[g]	$5,393	$7,963	$11,937	$16,910
Average Liability	$38,499	$87,926	$178,562	$447,536
Number of Farms with claims[h]	26	44	33	4
	(78.79)	(89.80)	(86.84)	(66.67)
Average Indemnity[i]	$12,746	$24,527	$46,738	$67,640
Frequency of claims[j]	2.962	2.273	1.788	1.750
	(42.31)	(32.47)	(25.45)	(25.00)

[a]Actuarially Fair Premium by Farm (AFPF) averages farms which paid a premium excluding farms with zero premiums

[b]Actuairally Fair Average Rate (AFAR) was calculated by dividing total indemnities by total liabilities including all farms within the category

[c]Average premium calculates the average paid premium resulting from AFAR

[d]Average Premium with claims is the average paid premium, assuming AFAR, using solely farms which received a minimum of one indemnity over the seven year period

[e]Actuarially Fair Average Rate for farms with Indemnities (AFARI) is the average rate computed using farms which genearted a minimum of one indemnity over the seven year period

[f]Average premium calculates the average premium paid resulting from the applied AFARI from all farms

[g]Average premium with claims is the average paid premium, assuming AFARI, using solely farms which generated a minimum of one indemnity over the seven year period

[h]Number of farms with claims presents the number of farms from the total which generated a minimum of one claim over the seven year period with percentages reported in parentheses below

[i]Average indemnity computes the average indeminty for farms which received a minimum of one indemnity over the seven year period

[j]Frequency of claims reflects the average number of claims each category generated excluding farms with zero claims with percentages in parentheses below

Table 4.66 Certainty Equivalent (CE) analysis assuming a logarithmic utility function for AFPF for all farms and farms with at least one claim

	Dairy	Beef	Livestock	Crop	Total
			AFPF all farms [1]		
Number of farms[2]	13	62	91	125	216
Mean AGRC w/o AGR-Lite	$337,798	$185,560	$217,856	$192,445	$203,236
Mean AGRC w/ AGR-Lite	$337,798	$185,560	$217,856	$192,445	$203,236
Standard Deviation w/o AGR-Lite[3]	$65,604	$53,685	$55,682	$71,536	$64,803
Standard Deviation w/ AGR-Lite[4]	$63,723	$50,229	$52,348	$62,941	$58,380
CE w/out AGR-Lite	$331,784	$182,416	$214,262	$179,414	$194,095
CE w/ AGR-Lite	$332,299	$183,897	$215,775	$183,993	$197,407
CE Change[5]	$1,674	$2,962	$3,129	$5,400	$4,769
	(0.50)	(1.60)	(1.44)	(2.81)	(2.35)
Min Change	$0	-$3,955	-$3,955	-$1,358	-$3,955
Max Change	$2,989	$22,895	$22,895	$64,610	$64,610
Percent w/ positive change	31%	47%	46%	83%	68%
			AFPF farms with claims [6]		
Number of farms[2]	4	31	44	106	150
Mean AGRC w/o AGR-Lite	$393,455	$161,763	$182,809	$182,705	$182,736
Mean AGRC w/ AGR-Lite	$393,455	$161,763	$182,809	$182,705	$182,736
Standard Deviation w/o AGR-Lite[3]	$103,222	$54,622	$57,182	$69,997	$66,144
Standard Deviation w/ AGR-Lite[4]	$97,110	$47,920	$50,442	$59,875	$56,949
CE w/out AGR-Lite	$381,702	$160,293	$179,938	$169,377	$172,475
CE w/ AGR-Lite	$383,376	$163,255	$183,066	$174,777	$177,243
CE Change[5]	$1,674	$2,962	$3,129	$5,400	$4,769
	(0.43)	(1.83)	(1.71)	(2.96)	(2.61)
Min Change	$248	-$3,955	-$3,955	-$1,358	-$3,955
Max Change	$2,989	$22,895	$22,895	$64,610	$64,610
Percent w/ positive change	100%	94%	95%	98%	97%

[1] Actuarially Fair Premium by Farm (AFPF) was calculated for each farm by dividing total indemnities (over the seven years) by 7. These results reflect all farms within each category.

[2] The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5] Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[6] Actuarially Fair Premium by Farm (AFPF) farms with claims reflects the CE results of those farms who received at least one indemnity over the seven year period

Table 4.67 Certainty Equivalent (CE) analysis assuming a logarithmic utility function for Actuarially Fair Average Rate (AFAR) for all farms and farms with at least one claim

	Dairy	Beef	Livestock	Crop	Total
			AFAR all farms [1]		
Number of farms[2]	13	62	91	125	216
Average Rate	0.70%	3.06%	2.41%	6.24%	4.54%
Mean AGRC w/o AGR-Lite	$337,798	$185,560	$217,856	$192,445	$203,236
Mean AGRC w/ AGR-Lite	$337,798	$185,560	$217,856	$192,445	$203,236
Standard Deviation w/o AGR-Lite[3]	$65,604	$53,685	$55,682	$71,536	$64,803
Standard Deviation w/ AGR-Lite[4]	$63,729	$50,173	$52,322	$62,997	$58,380
CE w/out AGR-Lite	$331,784	$182,416	$214,262	$179,414	$194,095
CE w/ AGR-Lite	$332,309	$183,414	$215,456	$183,842	$197,218
CE Change[5]	$525	$998	$1,194	$4,428	$3,123
	(0.16)	(0.54)	(0.55)	(2.30)	(1.54)
Min Change	-$2,606	-$21,189	-$16,679	-$41,624	-$31,482
Max Change	$9,450	$34,359	$40,576	$67,043	$75,050
Percent w/ positive change	31%	37%	38%	58%	48%
			AFAR farms with claims [6]		
Number of farms[2]	4	31	44	106	150
Average Rate	0.70%	3.06%	2.41%	6.24%	4.54%
Mean AGRC w/o AGR-Lite	$393,455	$161,763	$182,809	$182,705	$182,736
Mean AGRC w/ AGR-Lite	$396,544	$165,092	$186,383	$184,124	$185,486
Standard Deviation w/o AGR-Lite[3]	$103,222	$54,622	$57,182	$69,997	$66,144
Standard Deviation w/ AGR-Lite[4]	$97,131	$47,878	$50,434	$59,995	$57,001
CE w/out AGR-Lite	$381,702	$160,293	$179,938	$169,377	$172,475
CE w/ AGR-Lite	$386,530	$165,915	$186,215	$176,082	$179,843
CE Change[5]	$4,828	$5,621	$6,278	$6,705	$7,368
	(1.23)	(3.47)	(3.43)	(3.67)	(4.03)
Min Change	$1,476	-$8,341	-$7,690	-$18,957	-$23,530
Max Change	$9,450	$34,359	$40,576	$67,043	$75,050
Percent w/ positive change	100%	74%	80%	69%	69%

[1]Actuarially Fair Average Rate (AFAR) all farms reflects the average rate calculated by dividing total indemnities by total liabilities for all farms. These results reflect an average rate for all farms regardless of whether and indemnity was received.

[2]The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial AGRC by dividing CE change by inital AGRC and are located in parentheses below.

[6]Actuarially Fair Average Rate (AFAR) farms with claims reflects the CE results of those farms who received at least one indemnity over the seven year period

Table 4.68 Certainty Equivalent (CE) analysis assuming a logarithmic utility function for Actuarially Fair Average Rate for farms with Indemnities (AFARI) for all farms and farms with at least one claim

	Dairy	Beef	Livestock	Crop	Total
			AFARI all farms [1]		
Number of farms[2]	13	62	91	125	216
Average Rate	1.88%	6.01%	5.23%	7.45%	6.82%
Mean AGRC w/o AGR-Lite	$337,798	$185,560	$217,856	$192,445	$203,236
Mean AGRC w/ AGR-Lite	$335,250	$182,184	$214,014	$191,007	$200,349
Standard Deviation w/o AGR-Lite[3]	$65,604	$53,685	$55,682	$71,536	$64,803
Standard Deviation w/ AGR-Lite[4]	$63,740	$50,123	$52,295	$63,009	$58,383
CE w/out AGR-Lite	$331,784	$182,416	$214,262	$179,414	$194,095
CE w/ AGR-Lite	$329,718	$179,873	$211,461	$182,328	$194,199
CE Change[5]	-$2,066 (0.61)	-$2,543 (1.37)	-$2,801 (1.29)	$2,914 (1.51)	$104 (0.05)
Min Change	-$6,987	-$41,700	-$36,270	-$49,665	-$47,323
Max Change	$8,267	$27,942	$36,035	$61,359	$64,290
Percent w/ positive change	23%	26%	23%	52%	41%
			AFARI farms with claims [6]		
Number of farms[2]	4	31	44	106	150
Average Rate	1.88%	6.01%	5.23%	7.45%	6.82%
Mean AGRC w/o AGR-Lite	$393,455	$161,763	$182,809	$182,705	$182,736
Mean AGRC w/ AGR-Lite	$393,455	$161,763	$182,809	$182,705	$182,736
Standard Deviation w/o AGR-Lite[3]	$103,222	$54,622	$57,182	$69,997	$66,144
Standard Deviation w/ AGR-Lite[4]	$97,166	$47,843	$50,429	$60,019	$57,031
CE w/out AGR-Lite	$381,702	$160,293	$179,938	$169,377	$172,475
CE w/ AGR-Lite	$383,357	$162,340	$182,422	$174,584	$176,939
CE Change[5]	$1,656 (0.42)	$2,046 (1.26)	$2,484 (1.36)	$5,207 (2.85)	$4,464 (2.44)
Min Change	-$3,782	-$16,619	-$28,653	-$24,596	-$40,480
Max Change	$8,267	$27,942	$36,035	$61,359	$64,290
Percent w/ positive change	75%	52%	48%	61%	59%

[1]Actuarially Fair Average Rate for farms with Indemnities (AFARI) was calculated by dividing total indemnities by total liabilities for farms who received at least one indemnity over the seven year period. These results reflect an average rate determined from only those with at least one indemnity payment over the seven year period

[2]The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial AGRC by dividing CE change by inital AGRC and are located in parentheses below.

[6]Actuarially Fair Average Rate for farms with Indemnities (AFARI) farms with claims reflects the Certainty Equivalent (CE) results of those farms who received at least one indemnity over the seven year period

Table 4.69 Certainty Equivalent (CE) analysis of crop farms assuming a logarithmic utility function under Actuarially Fair Premium by Farm (AFPF) by Value of Farm Production (VFP) for all farms and farms with at least one claim

	<100	100-249	250-500	>500
	----------*(in thousands of dollars)*----------			
		AFPF all farms [1]		
Number of farms[2]	32	49	38	6
Mean AGRC w/o AGR-Lite	$54,210	$130,301	$291,674	$831,791
Mean AGRC w/ AGR-Lite	$54,210	$130,301	$291,674	$831,791
Standard Deviation w/o AGR-Lite[3]	$20,682	$44,214	$110,022	$330,623
Standard Deviation w/ AGR-Lite[4]	$17,034	$36,070	$97,440	$314,493
CE w/out AGR-Lite	$51,204	$121,088	$270,331	$763,724
CE w/ AGR-Lite	$52,738	$125,519	$276,300	$777,719
CE Change[5]	$1,964 (3.62)	$4,935 (3.79)	$6,873 (2.36)	$20,992 (2.52)
Min Change	$0	-$1,358	$0	$0
Max Change	$8,680	$35,514	$30,551	$64,610
Percent w/ positive change	78%	86%	87%	67%
		AFPF farms with claims [6]		
Number of farms[2]	25	44	33	4
Mean AGRC w/o AGR-Lite	$48,320	$125,575	$292,904	$775,482
Mean AGRC w/ AGR-Lite	$48,320	$125,575	$292,904	$775,482
Standard Deviation w/o AGR-Lite[3]	$18,507	$43,961	$114,526	$323,702
Standard Deviation w/ AGR-Lite[4]	$13,877	$34,891	$100,038	$299,508
CE w/out AGR-Lite	$45,445	$115,949	$270,152	$700,254
CE w/ AGR-Lite	$47,410	$120,884	$277,025	$721,246
CE Change[5]	$1,964 (4.07)	$4,935 (3.93)	$6,873 (2.35)	$20,992 (2.71)
Min Change	$79	-$1,358	$53	$4,023
Max Change	$8,680	$35,514	$30,551	$64,610
Percent w/ positive change	100%	95%	100%	100%

[1]Actuarially Fair Premium by Farm (AFPF) was calculated for each farm by dividing total indemnities (over the seven years) by 7. These results reflect all farms within each category.

[2]The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[6]Actuarially Fair Premium by Farm (AFPF) farms with claims reflects the CE results of those farms who received at least one indemnity over the seven year period

Table 4.70 Certainty Equivalent (CE) analysis for crop farms assuming a logarithmic utility function under Actuarially Fair Average Rate (AFAR) by Value of Farm Production (VFP) for all farms and farms with at least one claim

	<100	100-250	250-500	>500
	----------(in thousands of dollars)----------			
	AFAR all farms [1]			
Number of farms[2]	32	49	38	6
Average Rate	11.04%	8.13%	5.81%	2.52%
Mean AGRC w/o AGR-Lite	$54,210	$130,301	$291,674	$831,791
Mean AGRC w/ AGR-Lite	$54,210	$130,301	$291,674	$831,791
Standard Deviation w/o AGR-Lite[3]	$20,682	$44,214	$110,022	$330,623
Standard Deviation w/ AGR-Lite[4]	$16,972	$36,288	$97,528	$314,213
CE w/out AGR-Lite	$51,204	$121,088	$270,331	$763,724
CE w/ AGR-Lite	$52,237	$125,514	$276,282	$778,169
CE Change[5]	$1,033 (1.91)	$4,426 (3.40)	$5,951 (2.04)	$14,445 (1.74)
Min Change	-$5,867	-$8,925	-$9,126	-$16,787
Max Change	$10,986	$40,898	$59,616	$84,573
Percent w/ positive change	44%	59%	50%	50%
	AFAR farms with claims [6]			
Number of farms[2]	25	44	33	4
Average Rate	11.04%	8.13%	5.81%	2.52%
Mean AGRC w/o AGR-Lite	$48,320	$125,575	$292,904	$775,482
Mean AGRC w/ AGR-Lite	$49,441	$126,477	$294,102	$781,780
Standard Deviation w/o AGR-Lite[3]	$18,507	$43,961	$114,526	$323,702
Standard Deviation w/ AGR-Lite[4]	$13,836	$35,152	$100,212	$299,291
CE w/out AGR-Lite	$45,445	$115,949	$270,152	$700,254
CE w/ AGR-Lite	$47,983	$121,804	$278,239	$728,479
CE Change[5]	$2,537 (5.25)	$5,854 (4.66)	$8,088 (2.76)	$28,225 (3.64)
Min Change	-$5,070	-$7,246	-$9,126	-$1,543
Max Change	$10,986	$40,898	$59,616	$84,573
Percent w/ positive change	56%	66%	58%	75%

[1]Actuarially Fair Average Rate (AFAR) all farms reflects the average rate calculated by dividing total indemnities by total liabilities for all farms. These results reflect an average rate for all farms regardless of whether and indemnity was received.

[2]The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[6]Actuarially Fair Average Rate (AFAR) farms with claims reflects the Certainty Equivalent (CE) results of those farms who received at least one indemnity over the seven year period

Table 4.71 Certainty Equivalent (CE) analysis for crop farms assuming a logarithmic utility function under Actuarially Fair Average Rate for Farms with Indemnities (AFARI) by Value of Farm Production (VFP) for all farms and farms with at least one claim

	<100	100-250	250-500	>500
	----------*(in thousands of dollars)*----------			
	AFARI all farms [1]			
Number of farms[2]	32	49	38	6
Average Rate	13.93%	9.17%	6.45%	4.01%
Mean AGRC w/o AGR-Lite	$54,210	$130,301	$291,674	$831,791
Mean AGRC w/ AGR-Lite	$53,095	$129,387	$290,517	$825,100
Standard Deviation w/o AGR-Lite[3]	$20,682	$44,214	$110,022	$330,623
Standard Deviation w/ AGR-Lite[4]	$16,961	$36,317	$97,539	$314,049
CE w/out AGR-Lite	$51,204	$121,088	$270,331	$763,724
CE w/ AGR-Lite	$51,086	$124,562	$275,068	$771,116
CE Change[5]	-$118 (0.22)	$3,474 (2.67)	$4,738 (1.62)	$7,392 (0.89)
Min Change	-$7,416	-$10,068	-$10,670	-$26,758
Max Change	$10,183	$40,073	$58,032	$77,539
Percent w/ positive change	41%	59%	45%	50%
	AFARI farms with claims [6]			
Number of farms[2]	25	44	33	4
Average Rate	13.93%	9.17%	6.45%	4.01%
Mean AGRC w/o AGR-Lite	$48,320	$125,575	$292,904	$775,482
Mean AGRC w/ AGR-Lite	$48,320	$125,575	$292,904	$775,482
Standard Deviation w/o AGR-Lite[3]	$18,507	$43,961	$114,526	$323,702
Standard Deviation w/ AGR-Lite[4]	$13,832	$35,187	$100,232	$299,163
CE w/out AGR-Lite	$45,445	$115,949	$270,152	$700,254
CE w/ AGR-Lite	$46,830	$120,862	$276,980	$721,797
CE Change[5]	$1,384 (2.86)	$4,913 (3.91)	$6,829 (2.33)	$21,543 (2.78)
Min Change	-$6,527	-$8,474	-$10,670	-$8,533
Max Change	$10,183	$40,073	$58,032	$77,539
Percent w/ positive change	52%	66%	52%	75%

[1]Actuarially Fair Average Rate for farms with Indemnities (AFARI) was calculated by dividing total indemnities by total liabilities for farms who received at least one indemnity over the seven year period. These results reflect an average rate determined from only those farms receiving at least one indemnity payment over the seven year period and applied to all farms

[2]The discrepancy between farm numbers is a direct result of some farms generating negative Adjusted Gross Revenue to Count (AGRC) which are problematic to a logaritmic utility function. Therefore, these farms were ommitted from the Certainty Equivalent (CE) analysis.

[3] Standard deviation w/o AGR-Lite computes the average of the standard deviation by farm without participation in AGR-Lite

[4] Standard deviation w/ AGR-Lite computes the average of the standard deviation by farm with participation in AGR-Lite

[5]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[6]Actuarially Fair Average Rate for farms with Indemnities (AFARI) farms with claims reflects the Certainty Equivalent (CE) results of those farms who received at least one indemnity over the seven year period

Table 4.72 Downside Risk (DR) analysis for all farms assuming Actuarially Fair Average Rate (AFAR)

	Dairy	Beef	Livestock	Crop	Total
Average w/out AGR-Lite	$29,155	$13,158	$15,810	$9,126	$11,964
Minimum w/out AGR-Lite	-$47,236	-$56,383	-$56,383	-$53,531	-$56,383
Maximum w/out AGR-Lite	$264,963	$195,804	$264,963	$213,096	$264,963
Average w/ AGR-Lite	$29,155	$13,158	$15,810	$9,126	$11,964
Minimum w/ AGR-Lite	-$44,627	-$57,339	-$57,136	-$50,737	-$57,803
Maximum w/ AGR-Lite	$267,201	$181,427	$254,965	$172,521	$239,656
Average Change	$0	$0	$0	$0	$0
Minimum Change	-$2,577	-$20,603	-$16,220	-$40,575	-$30,602
Maximum Change	$6,302	$25,039	$25,495	$27,017	$30,961
Total Number of Farms	13	64	93	126	219
Number Decreased DR[1]	4 (30.77)	22 (34.38)	33 (35.48)	59 (46.83)	91 (41.55)
Average Decrease in DR[2]	$3,089 (10.59)	$5,993 (45.55)	$5,996 (37.93)	$6,402 (70.15)	$6,891 (57.60)
Number Increased DR[1]	9 (69.23)	42 (65.63)	60 (64.52)	67 (53.17)	128 (58.45)
Average Increase in DR[2]	-$1,373 (4.71)	-$3,139 (23.86)	-$3,298 (20.86)	-$5,637 (61.77)	-$4,899 (40.95)

[1]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[2]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below. Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.73 Downside Risk (DR) analysis for farms with at least on claim assuming Actuarially Fair Average Rate (AFAR)

	Dairy	Beef	Livestock	Crop	Total
Average w/out AGR-Lite	$50,827	$13,584	$14,766	$6,995	$9,331
Minimum w/out AGR-Lite	-$47,236	-$43,737	-$47,236	-$53,531	-$53,531
Maximum w/out AGR-Lite	$264,963	$142,585	$264,963	$160,020	$264,963
Average w/ AGR-Lite	$53,916	$16,913	$18,340	$8,414	$12,081
Minimum w/ AGR-Lite	-$44,627	-$43,746	-$47,351	-$50,737	-$50,761
Maximum w/ AGR-Lite	$267,201	$151,206	$254,965	$156,201	$239,656
Average Change[1]	$3,089	$3,329	$3,574	$1,419	$2,750
	(6.08)	(24.51)	(24.21)	(20.29)	(29.47)
Minimum Change	$1,206	-$8,294	-$9,998	-$22,256	-$25,307
Maximum Change	$6,302	$25,039	$25,495	$27,017	$30,961
Total Number of Farms	4	33	46	107	153
Number Decreased DR[2]	4	22	33	59	91
	(100)	(66.67)	(71.74)	(55.14)	(59.48)
Average Decrease in DR[3]	$3,089	$5,993	$5,996	$6,402	$6,891
	(6)	(44.12)	(40.61)	(91.52)	(73.85)
Number Increased DR[2]	0	11	13	48	62
	(0)	(33.33)	(28.26)	(44.86)	(40.52)
Average Increase in DR[3]	$0	-$1,998	-$2,574	-$4,705	-$3,328
	(0)	(14.71)	(17.43)	(67.26)	(35.67)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.
[2]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below
[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.
Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.74 Downside Risk (DR) analysis for all farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	Dairy	Beef	Livestock	Crop	Total
Average w/out AGR-Lite	$29,155	$13,158	$15,810	$9,126	$11,964
Minimum w/out AGR-Lite	-$47,236	-$56,383	-$56,383	-$53,531	-$56,383
Maximum w/out AGR-Lite	$264,963	$195,804	$264,963	$213,096	$264,963
Average w/ AGR-Lite	$26,607	$9,782	$11,968	$7,688	$9,078
Minimum w/ AGR-Lite	-$46,510	-$58,264	-$58,019	-$51,590	-$58,517
Maximum w/ AGR-Lite	$258,744	$167,527	$234,708	$164,694	$223,291
Average Change[1]	-$2,548 (8.74)	-$3,376 (25.66)	-$3,842 (24.30)	-$1,438 (15.76)	-$2,886 (24.12)
Minimum Change	-$6,909	-$40,521	-$35,250	-$48,402	-$45,976
Maximum Change	$5,147	$22,968	$23,516	$24,222	$25,662
Total Number of Farms	13	64	93	126	219
Number Decreased DR[2]	3 (23.08)	14 (21.88)	19 (20.43)	52 (41.27)	70 (31.96)
Average Decrease in DR[3]	$2,073 (7.11)	$5,086 (38.66)	$6,426 (40.64)	$6,070 (66.52)	$6,262 (52.34)
Number Increased DR[2]	10 (76.92)	50 (78.13)	74 (79.57)	74 (58.73)	149 (68.04)
Average Increase in DR[3]	-$3,935 (13.50)	-$5,746 (43.67)	-$6,478 (40.98)	-$6,714 (73.57)	-$7,184 (60.05)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.

[2]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.75 Downside Risk (DR) analysis for farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI)

	Dairy	Beef	Livestock	Crop	Total
Average w/out AGR-Lite	$50,827	$13,584	$14,766	$6,995	$9,331
Minimum w/out AGR-Lite	-$47,236	-$43,737	-$47,236	-$53,531	-$53,531
Maximum w/out AGR-Lite	$264,963	$142,585	$264,963	$160,020	$264,963
Average w/ AGR-Lite	$50,827	$13,584	$14,766	$6,995	$9,331
Minimum w/ AGR-Lite	-$46,510	-$44,563	-$51,862	-$51,590	-$54,405
Maximum w/ AGR-Lite	$258,744	$144,276	$234,708	$150,942	$223,291
Average Change	$0	$0	$0	$0	$0
Minimum Change	-$6,219	-$16,470	-$30,255	-$27,701	-$41,672
Maximum Change	$5,147	$22,968	$23,516	$24,222	$25,662
Total Number of Farms	4	33	46	107	153
Number Decreased DR[1]	3	14	19	52	70
	(75.00)	(42.42)	(41.30)	(48.60)	(45.75)
Average Decrease in DR[2]	$2,073	$5,086	$6,426	$6,070	$6,262
	(4.08)	(37.45)	(43.52)	(86.79)	(67.11)
Number Increased DR[1]	1	19	27	55	83
	(25.00)	(57.58)	(58.70)	(51.40)	(54.25)
Average Increase in DR[2]	-$6,219	-$3,748	-$4,522	-$5,739	-$5,281
	(12.24)	(27.59)	(30.62)	(82.05)	(56.60)

[1]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[2]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.76 Downside Risk (DR) analysis for crop farms assuming Actuarially Fair Average Rate (AFAR) by Value of Farm Production (VFP)

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
Average w/out AGR-Lite	-$18,533	-$4,911	$30,244	$142,139
Minimum w/out AGR-Lite	-$48,278	-$53,531	-$37,451	$68,981
Maximum w/out AGR-Lite	$16,663	$38,437	$149,392	$213,096
Average w/ AGR-Lite	-$18,533	-$4,911	$30,244	$142,139
Minimum w/ AGR-Lite	-$44,707	-$52,078	-$24,013	$63,557
Maximum w/ AGR-Lite	$16,986	$37,021	$144,219	$196,720
Average Change	$0	$0	$0	$0
Minimum Change	-$5,364	-$8,755	-$10,000	-$16,376
Maximum Change	$15,478	$17,055	$28,028	$16,664
Total Number of Farms	33	49	38	6
Number Decreased DR[1]	15 (45.45)	23 (46.94)	11 (28.95)	3 (50.00)
Average Decrease in DR[2]	$3,662 (19.76)	$5,203 (105.94)	$13,362 (44.18)	$10,206 (7.18)
Number Increased DR[1]	18 (54.55)	26 (53.06)	27 (71.05)	3 (50.00)
Average Increase in DR[2]	-$3,052 (16.47)	-$4,602 (93.71)	-$5,444 (18.00)	-$10,206 (7.18)

[1]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[2]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.77 Downside Risk (DR) analysis for crop farms with at least one claim assuming Actuarially Fair Average Rate (AFAR) by Value of Farm Production (VFP)

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
Average w/out AGR-Lite	-$18,498	-$5,648	$30,036	$121,676
Minimum w/out AGR-Lite	-$48,278	-$53,531	-$37,451	$68,981
Maximum w/out AGR-Lite	$16,663	$38,437	$149,392	$160,020
Average w/ AGR-Lite	-$17,377	-$4,746	$31,234	$127,974
Minimum w/ AGR-Lite	-$44,707	-$52,078	-$19,038	$63,557
Maximum w/ AGR-Lite	$16,986	$37,021	$144,219	$172,461
Average Change[1]	$1,121	$902	$1,198	$6,298
	(6.06)	(15.97)	(3.99)	(5.18)
Minimum Change	-$4,940	-$7,489	-$10,000	-$5,424
Maximum Change	$15,478	$17,055	$28,028	$16,664
Total Number of Farms	26	44	33	4
Number Decreased DR[2]	15	23	11	3
	(57.69)	(52.27)	(33.33)	(75.00)
Average Decrease in DR[3]	$3,662	$5,203	$13,362	$10,206
	(19.80)	(92.11)	(44.49)	(8.39)
Number Increased DR[2]	11	21	22	1
	(43.21)	(47.73)	(66.67)	(25.00)
Average Increase in DR[3]	-$2,344	-$3,808	-$4,884	-$5,424
	(12.67)	(67.41)	(16.26)	(4.46)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.

[2]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.78 Downside Risk (DR) analysis for crop farms assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI) by Value of Farm Production (VFP)

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
Average w/out AGR-Lite	-$18,533	-$4,911	$30,244	$142,139
Minimum w/out AGR-Lite	-$48,278	-$53,531	-$37,451	$68,981
Maximum w/out AGR-Lite	$16,663	$38,437	$149,392	$213,096
Average w/ AGR-Lite	-$19,648	-$5,825	$29,087	$135,448
Minimum w/ AGR-Lite	-$46,240	-$52,814	-$24,884	$56,797
Maximum w/ AGR-Lite	$15,820	$35,989	$143,326	$187,001
Average Change[1]	-$1,115	-$914	-$1,157	-$6,691
	(6.02)	(18.61)	(3.82)	(4.71)
Minimum Change	-$6,771	-$9,873	-$11,503	-$26,095
Maximum Change	$14,298	$16,241	$26,524	$10,133
Total Number of Farms	33	49	38	6
Number Decreased DR[2]	11	21	11	3
	(33.33)	(42.86)	(28.95)	(50.00)
Average Decrease in DR[3]	$3,748	$4,732	$12,044	$4,062
	(20.22)	(96.35)	(39.82)	(2.86)
Number Increased DR[2]	22	28	27	3
	(66.67)	(57.14)	(71.05)	(50.00)
Average Increase in DR[3]	-$3,546	-$5,148	-$6,535	-$17,443
	(19.13)	(104.82)	(21.61)	(12.27)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.

[2]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 4.79 Downside Risk (DR) analysis for crop farms with at least one claim assuming Actuarially Fair Average Rate for farms with Indemnities (AFARI) by Value of Farm Production (VFP)

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
Average w/out AGR-Lite	-$18,498	-$5,648	$30,036	$121,676
Minimum w/out AGR-Lite	-$48,278	-$53,531	-$37,451	$68,981
Maximum w/out AGR-Lite	$16,663	$38,437	$149,392	$160,020
Average w/ AGR-Lite	-$18,498	-$5,648	$30,036	$121,676
Minimum w/ AGR-Lite	-$46,240	-$52,814	-$20,255	$56,797
Maximum w/ AGR-Lite	$15,820	$35,989	$143,326	$165,930
Average Change	$0	$0	$0	$0
Minimum Change	-$6,333	-$8,689	-$11,503	-$12,185
Maximum Change	$14,298	$16,241	$26,524	$10,133
Total Number of Farms	26	44	33	4
Number Decreased DR[1]	11	21	11	3
	(42.31)	(47.73)	(33.33)	(75.00)
Average Decrease in DR[2]	$3,748	$4,732	$12,044	$4,062
	(20.26)	(83.77)	(40.10)	(3.34)
Number Increased DR[1]	15	23	22	1
	(57.69)	(52.27)	(66.67)	(25.00)
Average Increase in DR[2]	-$2,748	-$4,320	-$6,022	-$12,185
	(14.86)	(76.49)	(20.05)	(10.01)

[1]Number Increase/Decrease in Downside Risk (DR) reflect the farm numbers with increase/decrease for each category as a result of AGR-Lite, with their respective percentages in parentheses below

[2]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

Note: Downside Risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

4.8 Sensitivity Analysis

A number of assumptions were necessary in order to evaluate AGR-Lite as a stand-alone product. One assumption in particular was that for expected income (EI). Without the essential information to generate EI, it was assumed EI would equal AGRA. The logic behind setting EI equal to AGRA is that it was expected producers would not want to submit an EI less than AGRA as it would lower the overall guarantee, reducing the amount of protection. Sensitivity analysis was conducted to evaluate the impact of varying EI. Perhaps the most interesting result was revealed when EI was set equal to AFI for the current year (assuming the farm manager possessed perfect forecasting knowledge). Even with a guarantee linked directly to actual AFI, farms still received claims. The intuition for generating claims with perfect knowledge is attributed to the required accrual adjustments of inventories and accounts receivable. These adjustments weigh heavily in determining whether a claim results in an indemnity. A second scenario set EI to 80% of AGRA. Continuing with AGR-Lite procedures the guarantee would be based on EI since now EI is less than AGRA. Ultimately this results in a lower liability, which in turn decreases the magnitude of the indemnity payments and in some instances the frequency.

CHAPTER 5 - Summary and Conclusions

5.1 Summary

A panel data set of actual farm level income data was compiled to evaluate the impact of AGR-Lite on adjusted gross revenue to count (AGRC) and net farm income (NFI) variability for 219 southeast Kansas farms. Although actual income tax records were not available annual data over the period 1993 to 2005 from the Kansas Farm Management Association was used to reproduce the essential information a farm manager would need from IRS form 1040 schedule F and inventory records to purchase AGR-Lite (Langemeier, 2003). Five years of historical data were required to perform the necessary calculations for the revenue guarantee and to purchase AGR-Lite each year. The data set allowed us to calculate the impact of the whole-farm revenue insurance for the years 1999-2005. Income distributions for each farm over this 7 year period were calculated for two strategies; the farm manager did not insure and the manager insured each year using AGR-Lite as a stand-alone product. Furthermore each strategy was evaluated using three premium rate calculation methods. There were an Actuarially Fair Premium by Farm (AFPF), an Actuarially Fair Average Rate (AFAR), and an Actuarially Fair Average Rate for farms with Indemnities (AFARI) for each category. Although farm managers could enroll in alternative insurance products each year and the farm level data did contain premium and indemnity payments the data did not contain enough detail to identify which products these farms purchased. Necessary adjustments were made to examine the impact of purchasing AGR-Lite as a stand alone product.

The 219 farms were examined as an entire group and also categorized into four separate groups for analysis by determining which farms had more than 50% of their income from crops, livestock, beef, and dairy. There were 127 crop farms, 93 livestock farms that included beef, swine, dairy, poultry, and other animals. There were 64 beef farms and 13 dairy farms. The number of beef and dairy farms do not add to 93 because 16 farms had greater than 50% of their combined income from beef, dairy, swine, and other animals, but none had greater than 50% from either beef or dairy alone. Analysis was also conducted by grouping crop farms by Value of Farm Production (VFP) categories. There were 33 farms with VFP of less than $100,000, 49 farms with VFP of $100,000 to $249,999, 38 farms with VFP of $250,000 to $500,000, and 6 farms with VFP of greater than $500,000.

Income distributions of seven observations based on the years 1999-2005 for each strategy were calculated. The AGR-Lite strategy initially assumed a 75% coverage level and 90% payment rate. The income distributions were compared under AFPF, AFAR, and AFARI for each farm category. Statistics that indicate how effective AGR-Lite is at reducing income risk including changes in standard deviation, Coefficient of Variation (CV), and minimum outcomes of income were reported for AGRC and NFI. Certainty Equivalents (CE) and Downside Risk (DR) were also used to evaluate the risk reduction effectiveness of AGR-Lite.

5.2 Discussion of Results

5.2.1 Summary and Results by farm category

In general, for NFI only, this study indicates that participation in AGR-Lite reduced standard deviation and CV when evaluating all farms and farms with at least one

claim. Conversely beef farms were the lone farm category to report a constant increase in NFI standard deviation across premium scenarios. This was a direct result of AGR-Lite generating claims in more favorable years and less so in unfavorable (low) years. This leads to an increase in the range of the income distribution ultimately increasing absolute variability. Crop farms tallied the largest percent reductions to average NFI standard deviation followed by total, dairy, livestock, and beef for all farms and farms with claims.

Relative risk reductions, for NFI, were largest for total, crop, and livestock and lowest for beef and dairy, however there were no definitive rankings across categories. Surprisingly beef farms, which reported increases in absolute variability, indicated a slight reduction in relative risk. These conflicting results are attributed to the elimination of farms with negative CV, which cannot be interpreted, and were eliminated for analysis with CV statistics.

Overall each of the five categories (total, crop, livestock, beef, and dairy) increased the average minimum for NFI. The total category had the largest percent increase, in average minimum, followed by crop, livestock, beef, and dairy. However, following exclusion of farms with zero claims beef surpassed all others achieving the largest average minimum increase followed by total or livestock, crop, and dairy. In most farm categories, average maximums declined with AGR-Lite, which was expected. Beef farms did report increases to average maximums, which contributed to increased standard deviations.

On the whole crop farms generated the largest average premiums for AFPF, AFAR, and AFARI. As expected, premium rates increased when eliminating farms with

zero claims. Ranking farm categories from highest to lowest by premium rates resulted in crop farms as the highest followed by total, beef, livestock, and dairy.

A summary by frequency of claims ranks crop farms the highest followed by total, livestock, beef, and dairy. Consistent across farm categories was the increase in average liability as claims became more frequent. Additionally, as claims became more frequent, the variability in liability increased.

The previously discussed results reflect the general performance of the AGR-Lite product. However, the magnitude of change for standard deviation, CV, minimums, CE, and DR vary by premium scenario. Use of AFAR, which resulted in the lowest premiums, generally resulted in more favorable results, especially when excluding farms with zero claims. These are expected especially when compared against AFARI and AFPF, as AFAR resulted in the smallest premium rate. Results for risk reduction also varied when analyzing categories by all farms in comparison to those excluding farms with zero claims. Typically risk reduction results for farms with claims were more beneficial comparatively to all farms due to elimination of farms with lowered income distributions due to associated costs of insurance. Application of AFAR, to only farms with claims, on average, resulted in increases in average NFI. On the contrary, application of AFARI, to all farms, on average, resulted in reductions in average NFI. The remaining subsections will briefly discuss and summarize major findings by individual farm categories for NFI. Refer to Tables 5.1 and 5.2 which are used in the following summaries. Additionally Tables 5.3 and 5.4 present a summary of risk measures for the crop farm VFP categories.

Total

For 219 farms standard deviations declined with participation in AGR-Lite, on average, 6.96% and 9.93% for all farms and farms with claims, across premium scenarios, illustrated in Table 5.1 and 5.2. Average AFPF, AFAR and AFARI were $8,224, 4.54%, and 6.82% (Table 4.64). Under AFPF and AFAR standard deviations declined however AFARI resulted in an increase. Similar results were found for relative risk or CV. AFAR generated the largest CV decrease for all farms and farms with at least on claim at 6.66% and 27.24%. AFARI generated the only CV increase, which is counter intuitive considering every farm category (crop, livestock, beef, and dairy), which are included in the all farm category, generated relative risk reductions. Therefore it is expected that, on average, the entire group would reduce relative risk. The CV increase in all farms can be explained by an individual crop farm being removed from the crop category but included in the all farm category for NFI CV analysis due to corresponding premium rates of categories crop and total. This individual farm generated an abnormally large CV increase (7.6 to 71) due to a low NFI average and high standard deviation. Table 4.64 indicates that crop farms resulted in a higher AFARI (7.45%) relative to all farms (6.82%). Therefore when evaluating only crop farms the individual farm was removed from CV analysis because the higher AFARI, compared to all farms, generated a larger average premium which consequently resulted in a negative average NFI. As a result, using a negative average NFI the CV statistic was negative and thus removed for CV analysis. However, looking at the same farm only now applying the 6.82% rate for all farms, with a lower average premium the seven year average NFI remained positive. Since the average was not negative this farm was included for CV analysis for the all

farm category. By including this farm, the abnormally large CV change greatly influenced the overall average resulting in an average CV increase (11.91%). When removing the individual farm from the all farm category, average CV reduction for the remaining farms was 20.88% compared to the 11.91% increase when including the farm. Average minimum increased for every premium scenario with AFAR having the largest positive impact (105.77% and 116.33%) for all farms and farms with claims. Of the 219 farms, 153 generated at least one claim with an average indemnity of $26,213 (Table 4.64). These farms generated claims 31.37% of the time on average.

Crop

For the 126 crop farms, participation in AGR-Lite reduced standard deviation, on average, 11.25% and 13.16% for all farm and farms with at least one claim (Table 5.1 and 5.2). Reductions to CV ranged from 2.45% to 20.28% for all farms and farms with claims. Average minimums increased with participation in AGR-Lite on average, 75.72% and 74.83%, for all farms and farms with claims. For the 126 crop farms, average AFPF, AFAR, and AFARI were $8,778, 6.24%, and 7.45% (Table 4.64). Almost 85% of crop farms generated claims with an average indemnity and frequency of $27,056 and 32.44% (Table 4.64).

Livestock

With the participation of 93 livestock farms, AGR-Lite reduced standard deviation, on average, 0.31% and 0.63% for all farms and farms with claims, across premium scenarios (Table 5.1 and 5.2). Relative risk was also reduced with an average range of 1.26% to 26.96% for all farms and farms with claims. AFARI, for all farms, resulted in the only increase to CV. Average minimum increased under all premium

scenarios, except AFARI for all farms, ranging from 62.64% to 160.94%. These 93 farms yielded an average AFPF, AFAR, and AFARI of $6,621, 2.41%, and 5.23% (Table 4.64). Nearly 50% (46) of the 93 farms received at least one claim with an average indemnity and frequency of $22,924 and 28.88% (Table 4.64).

Beef

Participation in AGR-Lite for 64 beef farms resulted in increases to average standard deviation, across premium scenarios, on average, 0.85% and 2% for all farms and farms with claims (Tables 5.1 and 5.2). Interestingly, despite increases in standard deviation, relative risk declined under every premium scenario for all farms and farms with claims, except AFARI for all farms. This seems logical given AFARI resulted in the largest premium rate comparatively to AFPF and AFAR. Excluding AFARI for all farms, average CV reductions ranged from 0.72% to 26.80%. Average minimums increased, as a result of participation in AGR-Lite, for all premium scenarios except AFARI for all farms. Average increase for farms with claims ranged from 388.35% to 787.99%. Average AFPF, AFAR, and AFARI for 64 beef farms were $6,773, 3.06%, and 6.01%. With an average indemnity and frequency of $23,707 and 28.57%, 33 or 51.56% of farms generated claims (Table 4.64).

Dairy

With the smallest sample, 13 dairy farms were evaluated with participation in AGR-Lite. Overall average standard deviations declined, indicated in Tables 5.1 and 5.2, on average, 2.58% and 5.11% for all farms and farms with claims across premium scenarios. Likewise, relative risk was reduced under all premium scenarios, except AFARI for all farms, for all farms and farms with at least one claim. CV declines ranged

from 1.58% to 13.22%. Average minimums increased under all scenarios ranging from 0.60% to 23.57%. These 13 farms resulted in an average AFPF, AFAR, and AFARI of $4,926, 0.70%, and 1.88% (Table 4.64). Four farms received at least one claim with an average indemnity of $19,703 with a 25% frequency.

Certainty equivalent

CEs indicate how effective a risk management program is at reducing the variability within a given distribution. Ideally producers would prefer CE increases in the presence of insurance. In general, participation in AGR-Lite increased CEs across farm categories. Crop farms, again, generated the largest CE increase with dairy generating the least. This makes sense when considering crop farms generated a greater frequency of claims relative to dairy farms. Refer to CE summary Table 5.5 for the subsequent discussions.

All farms

Under AFPF, AFAR, and AFARI category crop generated the largest CE increase when calculated as a percent of initial AGRC. The absolute CE change ranged from $1,674 to $5,400 for AFPF, $525 to $4,428 for AFAR, and -$2,801 to $2,914 for AFARI. It was only under AFARI that dairy, beef, and livestock reported a negative average CE change. Farm categories crop and total reported positive increases. Under every premium rate scenario dairy marked the smallest increase in CE, with the exception of AFARI, to which livestock was smallest. For CE increases, measured as a percent of initial AGRC, dairy farms remained the lowest with the exception of AFARI to which beef was lowest. Percent of farms with increases in CE shrunk going from AFPF to AFAR to AFARI. Category crop reported the largest percent of farms with increases at

83%, 58%, and 52% for AFPF, AFAR, and AFARI. Conversely category dairy was last with 31%, 31%, and 23% respectively.

Farms with claims

After excluding farms with zero claims, little change occurs for ordinal ranking by CE increase as a percent of initial AGRC. Category crop ranked first in CE change for AFPF and AFARI; however under AFAR category crop ranked second to category total. Similar to category total, dairy ranked lowest for each premium scenario. Excluding farms with zero claims percent of farms with positive CE increases increased for each premium rate scenario. Under AFPF category dairy reported 100% of farms with increases followed by crop, total, livestock, and beef with 98%, 97%, 95%, and 94% respectively. Similar to category total results, moving from AFPF to AFAR to AFARI, percent of farms with increases declines. Category dairy remained the highest with most farms with increases for every premium scenario. Under AFAR, categories crop and total generated the smallest at 69%. Under AFARI category livestock reported only 48% with increases.

Downside Risk

Examination of DR reveals how effective a risk management program is at minimizing the greatest loss facing a producer. Ideally producers want to decrease DR through insurance. Participation in AGR-Lite resulted, in most instances, reduced initial DR revealing the products effectiveness in risk reduction. Crop farms exhibited the greatest initial DR (lowest average NFI) and on most occasions sustained the largest decrease (positive impact) in DR. Again, due to crop farms yielding the greatest frequency and magnitude of claims, it makes sense they sustained the largest decrease in

DR. Dairy farms, conversely, had the least initial DR (highest average NFI) comparatively, and generated the smallest decrease in DR, attributed to generating the lowest frequency and magnitude of claims. Refer to DR summary Table 5.7 for the following discussions.

All farms

Under AFAR and AFARI crop farms yield the largest decrease in DR, or greatest benefit, as a percent of initial DR. The remaining categories were arranged as follows; total, beef, livestock, and dairy. However, under AFARI beef and livestock rankings were interchanged. Average DR change, under AFARI, ranged from -$1,438 to -$2,842, which suggests an increase (negative impact) in DR. A comparison of categories including all farms reveals crop farms reported the largest percent of farms with decreased DR followed by total, livestock, beef, and dairy respectively for AFAR. Ranking under AFARI reveals farm category crop as highest followed by total, dairy, beef, and livestock. Although crop farms generated the largest decrease in DR, analysis solely on farms with increased DR (negatively affecting farms), indicates category crop reported the largest DR increase as a percent of initial DR. Conversely category dairy reported the smallest percent of farms with decreased DR under AFAR while livestock was lowest for AFARI. This suggests the ineffectiveness of AGR-Lite at benefiting dairy and livestock farms in DR.

Farms with claims

Excluding farms with zero claims initial DR increased, negatively impacting categories crop, total, and livestock, while categories beef and dairy decreased, positively impacting initial DR. Average change under AFAR ranged from $1,419 to $3,574,

indicating the presence of AGR-Lite benefited each farm category. For farms with decreased DR, crop farms, again, reported the greatest decrease, largest benefit, as a percent of initial DR followed by total, beef, livestock, and dairy. On the contrary crop farms reported the smallest percent of farms with decreased DR for AFAR, indicating a greater proportion of farms were adversely affected with participation in AGR-Lite, but ranked second behind dairy for AFARI. As such, crop farms had the largest percent of farms with increased DR for AFAR and the fourth lowest for AFARI. Furthermore crop farms tallied the largest increase in DR as a percent of initial DR for farms with increased DR followed by total, livestock, beef, and dairy for AFAR. Under AFARI livestock and beef were interchanged. These results, again, suggest that participation in AGR-Lite not only provides the most upside (beneficial) potential but the largest downside (detrimental) impact for crop farms.

5.2.2 Summary and Results by VFP category

In general, further analysis of farms by VFP levels, reveals participation in AGR-Lite reduced initial absolute variability for all farms and farms with claims for NFI, across premium scenarios. On average, VFP of $100,000 to $249,999 showed the greatest percent reduction, for all farms and farms with claims, in standard deviation followed by VFP of greater than $500,000, $250,000 to $500,000, and less than $100,000.

Relative risk reductions, with participation in AGR-Lite were consistent in NFI for all farms and farms with claims, for VFP categories greater than $250,000. VFP of less than $250,000 resulted in increases to relative risk for all farms. The greatest relative risk reductions were greatest for VFP of $250,000 to $500,000 for all farms and farms

with claims. Just the opposite VFP of less than $100,000 resulted in the largest increase to relative risk for both all farms and farms with at least one claim.

In the presence of AGR-Lite average minimums for all farms and farms with at least one claim increased, on average, for each VFP category under each premium scenario. VFP of greater $500,000 generated the largest average percent minimum increase for all farms. As for farms with at least one claim, VFP $100,000 to $249,999 generated the largest increase in average minimum.

Average AFPF increased as VFP categories increase in size which suggests higher VFP levels generated larger indemnities, confirmed in Table 4.65, relative to smaller VFP categories. Just the opposite, average AFAR and AFARI were highest for VFP of less than $100,000 and decrease as VFP levels increase. Given VFP of less than $100,000 generated the greatest frequency of claims it makes sense they correspond to the highest rate in comparison to other VFP categories.

A summary by frequency of claims ranks VFP of less than $100,000 the highest followed by VFP of $100,000 to $249,999, $250,000 to $500,000, and greater than $500,000. As claims became more frequent for VFP categories less than $500,000, average liability generally increased. Additionally, VFP categories less than $500,000 increased liability as claims became more frequent.

As was the case for all farm categories, elimination of farms with zero claims revealed greater benefits from participation in AGR-Lite. This is expected as results are no longer influenced by farms with lowered income distributions due only to premium costs. Refer to Tables 5.3 and 5.4 for the following summaries by VFP categories which discuss results from varying premiums.

VFP less than $100,000

There were 33 farms evaluated with participation in AGR-Lite for VFP of less than $100,000. Across premium scenarios, for all farms and farms with at least one claim, standard deviations declined, on average, 7.2% and 9.34% respectively (Tables 5.3 and 5.4). Despite reductions to absolute variability for each premium scenario, relative risk only declined under AFPF. Similar to standard deviation, minimums increased under each premium scenario, on average, 9.77% and 18.85% for all farms and farms with at least one claim, indicating AGR-Lite reduced downside risk. These 33 farms generated an average AFPF, AFAR, and AFARI of $5,393, 11.04%, and 13.93%. With an average indemnity of $12,746, 26 farms, on average, generated claims 42.31% of the time (Table 4.65).

VFP $100,000 to $249,999

With participation in AGR-Lite, 49 farms with an average VFP of $162,538, generated reductions to standard deviations, implying AGR-Lite reduced income variability. Standard deviations declined, on average, 13.45% and 15.13% for all farms and farms with at least one claim (Tables 5.3 and 5.4). Relative risk declined for premium scenarios AFPF and AFAR, however increased under AFARI, credited to the higher premium rate for all farms and farms with at least one claim. AGR-Lite was effective in increasing the average minimum, on average, 85.69% and 99.17% for all farms and farms with at least one claim. The 49 farms generated an average AFPF, AFAR, and AFARI of $7,963, 8.13%, and 9.17%. Only 5 farms received zero claims. The remaining 44 generated an average indemnity and frequency of $24,527 and 32.47%.

VFP $250,000 to $500,000

With an average VFP of $328,798, 38 farms were examined with participation in AGR-Lite. Overall, AGR-Lite proved effective in reducing absolute variability with average reductions of 11.56% and 12.70% for all farms and farms with at least one claim. Generating the largest relative risk reduction, in comparison to all VFP categories, the 38 farms reduced relative risk, on average, 16.28% and 21.65% for all farms and farms with at least one claim. Average minimums also benefited from AGR-Lite with average increases of 88.91% and 84.39% for all farms and farms with at least one claim. Average AFPF, AFAR, and AFARI were $11,937, 5.81% and 6.45%. With an average indemnity of $46,738, 33 farms generated claims, on average, 25.45% of the time.

VFP greater than $500,000

Participation in AGR-Lite, for the 6 farms, effectively reduced absolute variability, on average, 8.94% and 13.06% for all farms and farms with at least one claim. Relative risk declined an average 7.02% and 10.59% for all farms and farms with at least one claim. Average minimums benefited from AGR-Lite with average increases of 120.09% and 58.96% for all farms and farms with claims. Average AFPF, AFAR, and AFARI were $16,910, 2.52%, and 4.01%. Average indemnity for the group was $67,640 with an average frequency of claim of 25%.

Certainty Equivalents (CE)

In most cases, participation in AGR-Lite generated the greatest CE increase, indicating a reduction in variability over the seven years, for VFP of $100,000 to $249,999. In general each premium scenario resulted in a CE increase, positive impact, across VFP categories with the exception of VFP of less than $100,000. On average,

over 50% of the farms within each VFP category yielded positive CE increases. Refer to CE summary Table 5.6 for the following discussions.

All Farms

Across AFPF, AFAR, and AFARI, VFP of $100,000 to $249,999 generated the largest CE increase, indicating a reduction in variability over the seven years, measured as a percent of initial AGRC. Additionally this VFP category generated the greatest percent of farms with CE increases. VFP of less than $100,000 was the only category to generate an average reduction in CE for AFARI. Moving from AFPF to AFAR to AFARI, farms with positive CEs decline, due to increased premium rates resulting in higher overall premiums.

Farms with claims

Under AFPF and AFAR VFP of less than $100,000 generated the largest CE increases, as a percent of initial AGRC, compared to other VFP categories. It was VFP of $100,000 to $249,999 which reported the largest average CE increase, as a percent of initial AGRC, for VFP categories. As expected, percent of farms increase when excluding farms with zero claims, however moving to AFAR and AFARI result in fewer farms with positive CE changes attributed to increased premium rates.

Downside Risk

This study indicates smaller farms, lowest VFP, bear the greatest initial DR across VFP categories. For farms with decreased DR, benefiting producers, VFP of $100,000 to $249,999 generated the greatest decrease followed by VFP of $250,000 to $500,000, less than $100,000, and greater than $500,000. Along with generating the largest DR benefit,

VFP $100,000 to $249,999 also yielded the largest increase, negatively impacting DR, across VFP categories. Refer to DR summary Table 5.8 for the following discussions.

All Farms

Under AFAR and AFARI VFP of $100,000 to $249,999 generated the greatest benefit to DR with average decreases exceeding those compared to all VFP categories. Likewise this category proved most detrimental to DR with average increases of -$4,602 and -$5,148. VFP of greater than $500,000 generated both the smallest increase and decrease in DR across VFP categories. Furthermore VFP of greater than $500,000 generated the largest percent of farms with decreased DR.

Farms with claims

Similar results were found when eliminating farms with zero claims. VFP of $100,000 to $249,999 yielded the greatest benefit across categories decreasing DR $5,203 and $4,732 for AFAR and AFARI. Additionally this category proved most detrimental with average DR increases of $3,808 and $4,320 for AFAR and AFARI. Again VFP of greater than $500,000 reported the smallest DR decrease and increase compared to other VFP categories.

Overall Summary

It is difficult to advise a producer whether AGR-Lite will be beneficial to his or her operation given the complexity of the product. Many assumptions were made to examine the AGR-Lite insurance program. It should also be mentioned these results reflect participation in AGR-Lite as a stand-alone product. That said, the findings of this study do indicate that participation in AGR-Lite, on average, was most beneficial to crop farms. This is attributed to generating the greatest frequency in claims of any category.

Furthermore, crop farms reported the largest AFPF, AFAR, and AFARI across all categories. Dairy farms generated expected findings (reduced standard deviations, relative risk and DR, increased minimums and CE, however the impacts were rather minimal in comparison to other farm categories. Keep in mind dairy farm results were computed with a rather small sample including only 13 farms. Beef farms yielded the poorest results for standard deviations with increases ranging between 0.8% and 2%. However it was beef farms which generated the largest minimum increase of any category. It appears beef and livestock farms generated claims in more favorable years and less so in unfavorable years. Therefore the product may prove less beneficial to beef and livestock farms.

This research reveals evidence that farm size impacts the effectiveness of the program. It appears crop farms with VFP of $100,000 to $249,999 generated the greatest benefit from participation in AGR-Lite with the largest CE increases and decreased DRs compared to other VFP categories. Furthermore this VFP category yielded standard deviation and CV reductions that ranked near the top relative to other VFP categories.

5.3 Future Research

This work is one of the preliminary attempts to conduct an evaluation of the AGR-Lite risk management program. As such future research is needed to validate the findings of this study. Additional research to reveal the effectiveness of a whole-farm adjusted gross revenue program could investigate the impact of varying coverage levels, payment rates, and the use of AGR-Lite as a "wrap around" program, for which it was originally intended.

Analysis of AGR-Lite was conducted with the use of many assumptions. Therefore future research could explore the effect of altering the various assumptions to appraise the influence of such changes, potentially providing interesting comparisons to this study. Expected income was assumed to equal AGRA, which through sensitivity analysis, proved influential in both the frequency and magnitude of indemnity payments.

Other areas of exploration may delve into analyzing the impact of altering the current provisions of the policy. Farmers and policy makers alike have expressed concern surrounding purchased feed, exclusion of crop insurance indemnity payments when figuring AFI, and breeding livestock issues. Others have uttered concern that the policy covers "gross" not "net" revenue and as such limits the effectiveness of the program.

Although there are limitless research areas within the product itself, future research may consider comparing AGR-Lite to other FCIC products for risk reduction effectiveness. These, as well as others, offer great potential for discussion and further research of the AGR-Lite program.

5.4 Conclusions

Despite AGR-Lite being touted as easy to understand, due to its design, it was through this research which highlights its inherent complexity. Proponents contend that given the use of IRS Schedule F form 1040 minimal additional record keeping is required. However, as seen throughout this study, thorough records (inventories, accounts receivables, prepaid expenses, and accounts payable) in addition to Schedule F copies should and must be maintained for filing purposes. This preliminary research

draws attention to potential problem areas in addition to existing concerns with purchased feed, exclusion of crop insurance payments, and breeding livestock.

Purchased feed causes concern specifically for livestock producers. In years of drought or unfavorable yields, producers will likely resort to purchasing feed from external sources. Such purchases will not surface in figuring AGRC, which is used to determine the indemnity, however they will result in a reduction to net income but not gross, which AGR-Lite covers. Therefore the individual will effectively not be covered for such losses. Suggestions have been to classify livestock farms as strictly cattle sales and cattle sales with feed costs. This would then provide coverage to those farms which purchase feed. Currently AGR-Lite uses AFI as the revenue measure to establish the guarantee. Correlation coefficients between AFI and NFI reveal a weak to negligible correlation which suggests AFI to be a poor indicator of NFI behavior. Therefore AGRC was used for the risk analysis, due to higher correlations. Although AGRC does exhibit higher correlations they are still weak, thus a poor indicator of NFI variability. Preliminary correlation coefficients between NFI and VFP indicate a much stronger correlation, thus future research should consider analysis using VFP as the revenue measure. Use of VFP will also address current issues with purchased feed.

Exclusion of crop insurance payments in calculating AGRA but subtracting them from AGRC raises concern that the product fails to address multiple year losses. When so many farmers today rely on crop insurance payments this issue requires attention. The inability to include crop insurance payments in AGRA does not impact the current year however the guarantee will decline in years to come, which effectively reduce the level of guarantee offered by AGR-Lite. Subtracting crop insurance payments from AGRC

seems logical as it prevents producers from collecting for the same loss twice. Suggestions are to require that crop insurance payments be included in figuring AGRA and AGRC. In doing so this may be of some assistance to farmers experiencing multiple year losses, which as discussed earlier is a concern that has confounded many.

Currently the AGR-Lite policy includes cull cows in figuring AGRA and AGRC. However if cows are sold as part of herd reduction any receipts are thereby excluded from AGRC. This raises the question, when do cow sales switch from culls to herd reduction because of reduced pasture or feed resulting from drought conditions? Suggestions have been to establish a clear distinction between cull cows and herd reduction.

Other areas for concern deal with AGR-Lite guaranteeing gross revenue not net, thus high expense years due to increased fuel, fertilizer, chemical, and other energy costs do not necessarily trigger indemnity payments, especially when gross revenue remains relatively unchanged. These issues and others beg for further research to accurately and effectively evaluate participation in the AGR-Lite program.

Finally, certain components of this policy have potential to establish AGR-Lite as an effective risk management mechanism in the agricultural arena. With few programs offering protection for the whole farm, AGR-Lite is a step in the right direction. The findings of this study do indicate risk reduction however increased standard deviation, albeit rather small, of beef farms do draw concern. Additionally use of AFARI, which is believed to most accurately reflect actual premium rates, indicates heighten variability from a relative risk standpoint. However, with rather limited market exposure, AGR-Lite remains in the early stages of removing the inherent kinks of a novel program. Finally

producers must consider that factors which lead to increased variability in NFI but not gross income (which the policy covers) ultimately limit the effectiveness of AGR-Lite as a risk management tool. Therefore AGR-Lite may not be a viable risk management solution for some farms. AGR-Lite has undergone several revisions due to these concerns and additional criticisms and will likely continue to do so as it is more fully implemented.

Table 5.1 Summary of risk measures for AFPF, AFAR, and AFARI by farm category including all farms for Net Farm Income (NFI)

	AFPF	AFAR	AFARI	Average[1]
Total (219 Farms)				
Average Stdev.	-6.89%	-6.97%	-7.01%	-6.96%
Average CV	-6.00%	-6.66%	18.94%	2.09%
Average Minimum	104.12%	105.77%	62.93%	90.94%
Crop (126 Farms)				
Average Stdev.	-11.12%	-11.31%	-11.34%	-11.25%
Average CV	-7.93%	-2.45%	-9.52%	-6.63%
Average Minimum	77.26%	79.95%	69.97%	75.72%
Livestock (93 Farms)				
Average Stdev.	-0.32%	-0.31%	-0.29%	-0.31%
Average CV	-1.26%	-8.10%	17.12%	2.59%
Average Minimum	64.55%	62.64%	-65.07%	20.70%
Beef (64 Farms)				
Average Stdev.	0.90%	0.85%	0.81%	0.85%
Average CV	-0.72%	-5.18%	53.84%	15.98%
Average Minimum	57.46%	57.20%	-57.03%	19.21%
Dairy (13 Farms)				
Average Stdev.	-2.63%	-2.59%	-2.52%	-2.58%
Average CV	-2.35%	-1.58%	3.19%	-0.25%
Average Minimum	8.54%	8.39%	0.60%	5.84%

[1]Average calculates the simple average of the average standard deviation, Coefficient of Variation (CV), and minimum values from Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), and Actuarially Fair Average Rate for farms with Indemnities (AFARI) by farm category

Table 5.2 Summary of risk measures for AFPF, AFAR, and AFARI by farm category for farms with at least one claim for Net Farm Income (NFI)

	AFPF	AFAR	AFARI	Average[1]
Total (153 Farms)				
Average Stdev.	-9.90%	-9.94%	-9.95%	-9.93%
Average CV	-8.45%	-27.24%	11.91%	-7.93%
Average Minimum	90.19%	116.33%	91.64%	99.39%
Crop (107 Farms)				
Average Stdev.	-13.10%	-13.21%	-13.22%	-13.17%
Average CV	-10.24%	-8.95%	-20.28%	-13.16%
Average Minimum	70.97%	80.65%	72.88%	74.83%
Livestock (46 Farms)				
Average Stdev.	-0.69%	-0.64%	-0.56%	-0.63%
Average CV	-2.32%	-26.96%	-17.17%	-15.48%
Average Minimum	85.74%	160.94%	82.58%	109.75%
Beef (33 Farms)				
Average Stdev.	2.02%	1.99%	1.98%	2.00%
Average CV	-1.31%	-26.80%	-14.49%	-14.20%
Average Minimum	393.83%	787.99%	388.35%	523.39%
Dairy (4 Farms)				
Average Stdev.	-5.19%	-5.12%	-5.01%	-5.11%
Average CV	-8.20%	-13.22%	-10.90%	-10.77%
Average Minimum	17.83%	23.57%	17.45%	19.62%

[1]Average calculates the simple average of the average standard deviation, Coefficient of Variation (CV), and minimum values from Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), and Actuarially Fair Average Rate for farms with Indemnities (AFARI) by farm category

Table 5.3 Summary of risk measures for AFPF, AFAR, and AFARI for crop farms by Value of Farm Production (VFP) for all farms for NFI

	AFPF	AFAR	AFARI	Average[1]
<$100,000 (33 Farms)				
Average Stdev	-6.95%	-7.30%	-7.35%	-7.20%
Average CV	-1.66%	107.24%	41.50%	49.03%
Average Minimum	12.27%	13.74%	3.29%	9.77%
$100,000-$249,999 (49 Farms)				
Average Stdev	-13.34%	-13.49%	-13.50%	-13.45%
Average CV	-8.58%	-4.58%	27.60%	4.81%
Average Minimum	87.96%	89.29%	79.82%	85.69%
$250,000-$500,000 (38 Farms)				
Average Stdev	-11.50%	-11.59%	-11.60%	-11.56%
Average CV	-13.11%	-19.15%	-16.59%	-16.28%
Average Minimum	89.07%	91.46%	86.20%	88.91%
>$500,000 (6 Farms)				
Average Stdev	-8.73%	-8.97%	-9.11%	-8.94%
Average CV	-8.72%	-8.25%	-4.08%	-7.02%
Average Minimum	125.24%	130.84%	104.20%	120.09%

[1]Average calculates the simple average of the average standard deviation, Coefficient of Variation (CV), and minimum values from Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), and Actuarially Fair Average Rate for farms with Indemnities (AFARI) by Value of Farm Production (VFP) category

Table 5.4 Summary of risk measures for AFPF, AFAR, and AFARI for crop farms by Value of Farm Production (VFP) for farms with at least one claim for Net Farm Income (NFI)

	AFPF	AFAR	AFARI	Average[1]
<$100,000 (26 Farms)				
Average Stdev	-9.10%	-9.44%	-9.48%	-9.34%
Average CV	-5.01%	121.72%	30.53%	49.08%
Average Minimum	14.55%	25.94%	16.07%	18.85%
$100,000-$249,999 (44 Farms)				
Average Stdev	-15.07%	-15.16%	-15.16%	-15.13%
Average CV	-9.07%	-20.99%	3.05%	-9.00%
Average Minimum	95.12%	105.73%	96.66%	99.17%
$250,000-$500,000 (33 Farms)				
Average Stdev	-12.66%	-12.71%	-12.71%	-12.70%
Average CV	-14.73%	-26.14%	-24.07%	-21.65%
Average Minimum	81.65%	87.95%	83.58%	84.39%
>$500,000 (4 Farms)				
Average Stdev	-12.91%	-13.08%	-13.18%	-13.06%
Average CV	-11.29%	-12.38%	-8.09%	-10.59%
Average Minimum	55.25%	64.64%	56.99%	58.96%

[1]Average calculates the simple average of the average standard deviation, Coefficient of Variation (CV), and minimum values from Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), and Actuarially Fair Average Rate for farms with Indemnities (AFARI) by Value of Farm Production (VFP) category

Table 5.5 Certainty Equivalent (CE) summary by farm category for all farms and farms with at least one claim for AFPF, AFAR, and AFARI

	Dairy	Beef	Livestock	Crop	Total
AFPF all farms					
CE Change[1]	$1,674	$2,962	$3,129	$5,400	$4,769
	(0.50)	(1.60)	(1.44)	(2.81)	(2.35)
Percent w/ positive change[2]	31%	47%	46%	83%	68%
AFPF farms with claims					
CE Change[1]	$1,674	$2,962	$3,129	$5,400	$4,769
	(0.43)	(1.83)	(1.71)	(2.96)	(2.61)
Percent w/ positive change[2]	100%	94%	95%	98%	97%
AFAR all farms					
CE Change[1]	$525	$998	$1,194	$4,428	$3,123
	(0.16)	(0.54)	(0.55)	(2.30)	(1.54)
Percent w/ positive change[2]	31%	37%	38%	58%	48%
AFAR farms with claims					
CE Change[1]	$4,828	$5,621	$6,278	$6,705	$7,368
	(1.23)	(3.47)	(3.43)	(3.67)	(4.03)
Percent w/ positive change[2]	100%	74%	80%	69%	69%
AFARI all farms					
CE Change[1]	-$2,066	-$2,543	-$2,801	$2,914	$104
	(0.61)	(1.37)	(1.29)	(1.51)	(0.05)
Percent w/ positive change[2]	23%	26%	23%	52%	41%
AFARI farms with claims					
CE Change[1]	$1,656	$2,046	$2,484	$5,207	$4,464
	(0.42)	(1.26)	(1.36)	(2.85)	(2.44)
Percent w/ positive change[2]	75%	52%	48%	61%	59%

[1]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[2]Percent with positive change indicates the percent of farms with increased CE, indicating a reduction in income variability over the seven year period.

Note: Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), Actuarially Fair Average Rate for farms with Indemnities (AFARI)

Table 5.6 Certainty Equivalent (CE) summary for VFP categories for all farms and farms with at least one claim for AFPF, AFAR, and AFARI

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
AFPF all farms				
CE Change[1]	$1,964	$4,935	$6,873	$20,992
	(3.62)	(3.79)	(2.36)	(2.52)
Percent w/ positive change[2]	78%	86%	87%	67%
AFPF farms with claims				
CE Change[1]	$1,964	$4,935	$6,873	$20,992
	(4.07)	(3.93)	(2.35)	(2.71)
Percent w/ positive change[2]	100%	95%	100%	100%
AFAR all farms				
CE Change[1]	$1,033	$4,426	$5,951	$14,445
	(1.91)	(3.40)	(2.04)	(1.74)
Percent w/ positive change[2]	44%	59%	50%	50%
AFAR farms with claims				
CE Change[1]	$2,537	$5,854	$8,088	$28,225
	(5.25)	(4.66)	(2.76)	(3.64)
Percent w/ positive change[2]	56%	66%	58%	75%
AFARI all farms				
CE Change[1]	-$118	$3,474	$4,738	$7,392
	(0.22)	(2.67)	(1.62)	(0.89)
Percent w/ positive change[2]	41%	59%	45%	50%
AFARI farms with claims				
CE Change[1]	$1,384	$4,913	$6,829	$21,543
	(2.86)	(3.91)	(2.33)	(2.78)
Percent w/ positive change[2]	52%	66%	52%	75%

[1]Certainty Equivalent (CE) changes were calculated excluding farms with a zero change in CE. Therefore these results reveal the change in CE for those farms with changes. CE changes were calculated as a percent of initial Adjusted Gross Revenue to Count (AGRC) by dividing CE change by inital AGRC and are located in parentheses below.

[2]Percent with positive change indicates the percent of farms with increased CE, indicating a reduction in income variability over the seven year period.
Note: Actuarially Fair Premium by Farm (AFPF), Actuarially Fair Average Rate (AFAR), Actuarially Fair Average Rate for farms with Indemnities (AFARI), Value of Farm Production (VFP)

Table 5.7 Downside Risk (DR) summary by farm category for all farms and farms with at least one claim for AFAR and AFARI*

	Dairy	Beef	Livestock	Crop	Total
AFAR All farms					
Number Decreased DR[2]	4	22	33	59	91
	(30.77)	(34.38)	(35.48)	(46.83)	(41.55)
Average Decrease in DR[3]	$3,089	$5,993	$5,996	$6,402	$6,891
	(10.59)	(45.55)	(37.93)	(70.15)	(57.60)
Average Increase in DR[3]	-$1,373	-$3,139	-$3,298	-$5,637	-$4,899
	(4.71)	(23.86)	(20.86)	(61.77)	(40.95)
AFAR farms with claims					
Average Change[1]	$3,089	$3,329	$3,574	$1,419	$2,750
	(6.08)	(24.51)	(24.21)	(20.29)	(29.47)
Number Decreased DR[2]	4	22	33	59	91
	(100)	(66.67)	(71.74)	(55.14)	(59.48)
Average Decrease in DR[3]	$3,089	$5,993	$5,996	$6,402	$6,891
	(6)	(44.12)	(40.61)	(91.52)	(73.85)
Average Increase in DR[3]	$0	-$1,998	-$2,574	-$4,705	-$3,328
	(0)	(14.71)	(17.43)	(67.26)	(35.67)
AFARI all farms					
Average Change[1]	-$2,548	-$3,376	-$3,842	-$1,438	-$2,886
	(8.74)	(25.66)	(24.30)	(15.76)	(24.12)
Number Decreased DR[2]	3	14	19	52	70
	(23.08)	(21.88)	(20.43)	(41.27)	(31.96)
Average Decrease in DR[3]	$2,073	$5,086	$6,426	$6,070	$6,262
	(7.11)	(38.66)	(40.64)	(66.52)	(52.34)
Average Increase in DR[3]	-$3,935	-$5,746	-$6,478	-$6,714	-$7,184
	(13.50)	(43.67)	(40.98)	(73.57)	(60.05)
AFARI farms with claims					
Number Decreased DR[2]	3	14	19	52	70
	(75.00)	(42.42)	(41.30)	(48.60)	(45.75)
Average Decrease in DR[3]	$2,073	$5,086	$6,426	$6,070	$6,262
	(4.08)	(37.45)	(43.52)	(86.79)	(67.11)
Average Increase in DR[3]	-$6,219	-$3,748	-$4,522	-$5,739	-$5,281
	(12.24)	(27.59)	(30.62)	(82.05)	(56.60)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.

[2]Number Decrease in Downside Risk (DR) reflect the farm numbers with decreases for each category as a result of AGR-Lite, with the respective percentage in parentheses below

[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

*Actuarially Fair Average Rate (AFAR), Actuarially Fair Average Rate for farms with Indemnities (AFARI)

Note: Downside risk (DR) was calculated using Net Farm Income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside Risk (DR) is as follows: DR = NFI - (family living cost x # of farm operators)

Table 5.8 Downside Risk (DR) summary of crop farms for all farms and farms with at least one claim for AFAR and AFARI for VFP categories*

	<100	100-249	250-500	>500
	----------(in thousands of dollars)----------			
AFAR all farms				
Number Decreased DR[2]	15	23	11	3
	(45.45)	(46.94)	(28.95)	(50.00)
Average Decrease in DR[3]	$3,662	$5,203	$13,362	$10,206
	(19.76)	(105.94)	(44.18)	(7.18)
Average Increase in DR[3]	-$3,052	-$4,602	-$5,444	-$10,206
	(16.47)	(93.71)	(18.00)	(7.18)
AFAR farms with claims				
Average Change[1]	$1,121	$902	$1,198	$6,298
	(6.06)	(15.97)	(3.99)	(5.18)
Number Decreased DR[2]	15	23	11	3
	(57.69)	(52.27)	(33.33)	(75.00)
Average Decrease in DR[3]	$3,662	$5,203	$13,362	$10,206
	(19.80)	(92.11)	(44.49)	(8.39)
Average Increase in DR[3]	-$2,344	-$3,808	-$4,884	-$5,424
	(12.67)	(67.41)	(16.26)	(4.46)
AFARI all farms				
Average Change[1]	-$1,115	-$914	-$1,157	-$6,691
	(6.02)	(18.61)	(3.82)	(4.71)
Number Decreased DR[2]	11	21	11	3
	(33.33)	(42.86)	(28.95)	(50.00)
Average Decrease in DR[3]	$3,748	$4,732	$12,044	$4,062
	(20.22)	(96.35)	(39.82)	(2.86)
Average Increase in DR[3]	-$3,546	-$5,148	-$6,535	-$17,443
	(19.13)	(104.82)	(21.61)	(12.27)
AFARI farms with claims				
Number Decreased DR[2]	11	21	11	3
	(42.31)	(47.73)	(33.33)	(75.00)
Average Decrease in DR[3]	$3,748	$4,732	$12,044	$4,062
	(20.26)	(83.77)	(40.10)	(3.34)
Average Increase in DR[3]	-$2,748	-$4,320	-$6,022	-$12,185
	(14.86)	(76.49)	(20.05)	(10.01)

[1]Average change reflects the average Downside Risk (DR) change for each farm category. For a comparison measure average change was calculated as a percent of average without AGR-Lite by dividing average change by average without AGR-Lite, located in parentheses below.

[2]Number Decrease in Downside Risk (DR) reflect the farm numbers with decreases for each category as a result of AGR-Lite, with the respective percentage in parentheses below

[3]Average increase/decrease reflects the average change in Downside Risk (DR) excluding farms with a zero change. Dividing average increase/decrease by average w/out AGR-Lite reveals the increase/decrease as a percent of average w/out AGR-Lite, located in parentheses below.

*Actuarially Fair Average Rate (AFAR), Actuarially Fair Average Rate for farms with Indemnities (AFARI), Value of Farm Production (VFP)

Note: Downside risk (DR) was calculated using net farm income (NFI), average family living cost obtained from KFMA, and the number of farm operators. The formula for Downside risk is as follows: DR = NFI - (family living cost x # of farm operators)

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Appendix A - STATA Code

Appendix A presents the STATA code used to generate critical variables AFI, AE, PE (beginning and ending), AR (beginning and ending), and IN (beginning and ending). The code also provides formulas used to generate NFI and establish enterprise categories used for analysis. Additionally code was included that was used to derive VFP categories for crop farms.

```
#delimit ;

format farm %8.0f;

/*Allowable Income Derivation*/

gen AFI = ((v079 + v083 + v087 + v091 + v099 + v165) - (v103 + v107 + v111 + v115 +
v123 + v167)) +(v601 + v604 + v607 + v610 + v613 + v616 + v619 + v622 + v628 +
v631 + v634 + v637 + v640 + v643 + v646 + v649 + v652 + v655 + v658 + v661 + v664
+ v667 + v670 + v673 + v676 + v679 + v682 + v685 + v688 + v039 + v043 + v047 +
v051 + v055 + v157 + v280 + v281) + (v161) + (v285 + (v288 - v159 - v161 - v163) -
(v482 + v483 - v171) + (v095 - v119) + (v839 - v869));

/*Expense Derivation*/

gen AE = (v103 + v107 + v111 + v115 + v123 + v167) + (v309 + v307 + v308 + v296 +
v293 + v295 + v301 + v514 + v304 + v289 + v290 + v291 + v294 + v299 + v305 + v298
+ v300 + v515 + v297 + v071);
```

```
/*Prepaid Expenses*/

gen PPBeg = (v546 + v548 + v552 + v554 + v556 + v558 + v560 + v562 + v568 +
v570);

gen PPEnd = (v547 + v549 + v553 + v555 + v557 + v559 + v561 + v563 + v569 +
v571);

gen APPEnd  =  PPBeg[_n+1] if year< 105;
replace APPEnd  =  PPEnd if year == 105;

/*Accounts Receivable*/
gen ARBeg = (v458 + v460 + v477);
gen AREnd = (v459+ v461 + v478);
gen AAREnd  =  ARBeg[_n+1] if year < 105;
replace AAREnd  =  AREnd if year == 105;

/*Inventories*/

gen INBeg =(v182 + v200 + v212 + v224 + v230 + v236 + v242 + v248 + v254 + v258 +
v260+ v496 + v498 + v500 + v502 + v504);

gen INEnd = (v185 + v203 + v215 + v227 + v233 + v239 + v245 + v251 + v257 + v259
+ v261 + v497 + v499 + v501 + v503 + v505);

gen AINEnd  =  INBeg[_n+1] if year < 105;

replace AINEnd  =  INEnd if year == 105;

/* Dropping Farms with Negative values for AFI AE PP AP and IN */
```

```
/* Dropping farms because AE <0 */

drop if farm == 11802300;
drop if farm == 14089100;
drop if farm == 14783100;
drop if farm == 20601300;
drop if farm == 20640500;
drop if farm == 33505600;
drop if farm == 33540000;
drop if farm == 39305600;
drop if farm == 39395700;
drop if farm == 43988100;
drop if farm == 44691300;
drop if farm == 45440104;
drop if farm == 46200800;
drop if farm == 46201400;
drop if farm == 59930900;
drop if farm == 63103600;
drop if farm == 64490900;
drop if farm == 64980200;
drop if farm == 66390100;
drop if farm == 66801000;
drop if farm == 67294200;

/* Dropping farms because AE <0 */

drop if farm == 23340302;
drop if farm == 41903000;
```

```
/* Dropping farms because PPBeg <0 */

 drop if farm == 57706400;
 drop if farm == 57860100;
 drop if farm == 58050400;
 drop if farm == 59909000;
 drop if farm == 59970200;
 drop if farm == 59980300;
 drop if farm == 60590300;
 drop if farm == 60803000;
 drop if farm == 60809300;
 drop if farm == 60811600;
 drop if farm == 60850104;
 drop if farm == 60889000;
 drop if farm == 62187000;
 drop if farm == 65282000;
 drop if farm == 66389000;
 drop if farm == 66803500;

/* Dropping farms because PPEnd <0 */

drop if farm == 40704000;
drop if farm == 57706400;
drop if farm == 57860100;
drop if farm == 59909000;
drop if farm == 59970200;
drop if farm == 59980300;
drop if farm == 59980300;
drop if farm == 60590300;
drop if farm == 60803000;
drop if farm == 60809300;
```

```
drop if farm == 60811600;
drop if farm == 60850104;
drop if farm == 60889000;
drop if farm == 62103600;
drop if farm == 62187000;
drop if farm == 62187100;
drop if farm == 62191800;
drop if farm == 63187000;
drop if farm == 64970100;
drop if farm == 64980100;
drop if farm == 65282000;
drop if farm == 66389000;
drop if farm == 66803500;

/* Dropping farms because ARBeg <0 */

drop if farm == 22806100;
drop if farm == 44500700;
drop if farm == 57400500;
drop if farm == 58060100;
drop if farm == 58210500;
drop if farm == 58270100;

/* Dropping farms because AREnd <0*/

drop if farm == 22806100;
drop if farm == 57400500;
drop if farm == 58210500;
drop if farm == 58270100;
```

```
/* Adjusted NFI without Crop Insurance*/

gen NFI = v006 - (v625 + v529 - v528) + v598;
egen aNFI = mean(NFI), by(farm);

/*Crop Income*/

gen CI = v095 + v099  + (v288 - v159 - v161 - v163) + v601 + v604 + v607 + v610 +
v613 + v616 + v619 + v622 + v628 + v631 + v634 + v637 + v640 + v643 + v646 + v649
+ v652 + v655 + v658 + v661+ v664 + v667 + v670 + v673 + v676 + v679 + v682 +
v685 + v688;

/* Dropping farms because v288 other income <0*/

drop if farm == 62903800;
drop if farm == 66370100;

/*gen CI = (v095 -  v119) + (v099 - v123) + (v288 - v159 - v161 - v163) + v601 + v604
+ v607 + v610 + v613 + v616 + v619 + v622 + v628 + v631 + v634 + v637 + v640 +
v643 + v646 + v649 + v652 + v655 + v658 + v661+ v664 + v667 + v670 + v673 + v676
+ v679 + v682 + v685 + v688;*/

egen aCI = mean(CI), by(farm);

/*Livestock Income*/

gen LI = v039 + v043 + v047 + v051 + v055 + v079 + v083 + v087 + v091 + v157 +
v165 + v280 + v281 + v839;

/*gen LI = v039 + v043 + v047 + v051 + v055 + (v079 - v103) + (v083 - v107) + (v087 -
v111) + (v091 - v115) + v157 + (v165 - v167) + v280 + v281 + (v839 - v869);*/
```

```
egen aLI = mean(LI), by(farm);

/*Beef Income*/
gen BI = v039 + v079;

/*gen BI = v039 + (v079 - v103);*/
egen aBI = mean(BI), by(farm);

/*Dairy Income*/
gen DI = v043 + v083 + v280;

/*gen DI = v043 + (v083 - v107) + v280;*/
egen aDI = mean(DI), by(farm);

/*Swine Income*/
gen SI = v051 + v091;

/*gen SI = v051 + (v091 - v115);*/
egen aSI = mean(SI), by(farm);

/*Total Crop and Livestock Income*/
gen TI = CI + LI;

/*Wheat Income*/
gen WheatI = v616;
egen aWheatI = mean(v616), by(farm);
drop if farm == 59990200; /*negative wheat income*/

/*Bean Income*/
gen BeanI = v661;
```

```
egen aBeanI = mean(v661), by(farm);

/*Corn Income*/
gen CornI = v604;
egen aCornI = mean(v604), by(farm);
drop if farm == 63103900; /*negative corn income*/

/*Sorghum Income*/
gen SorghI = v607;
egen aSorghI = mean(v607), by(farm);

/*Major Crop Income*/
gen MCropI = v616+v661+v604+v607;
egen aMCropI = mean(MCropI), by(farm);

/* Percent Incomes*/

gen CIper = CI/TI;
egen aCIper = mean(CIper), by(farm);

gen LIper = LI/TI;
egen aLIper = mean(LIper), by(farm);

gen BIper = BI/TI;
egen aBIper = mean(BIper), by(farm);

gen BIperLI = BI/LI;
egen aBIperLI = mean(BIperLI), by(farm);

gen DIper = DI/TI;
egen aDIper = mean(DIper), by(farm);
```

```
gen DIperLI = DI/LI;
egen aDIperLI = mean(DIperLI), by(farm);

gen SIper = SI/TI;
egen aSIper = mean(SIper), by(farm);

gen SIperLI = SI/LI;
egen aSIperLI = mean(SIperLI), by(farm);

gen Wheatper = WheatI/TI;
egen aWheatper = mean(Wheatper), by(farm);

gen WheatperCI = WheatI/CI;
egen aWheatCI = mean(WheatperCI), by(farm);

gen Beanper = BeanI/TI;
egen aBeanper = mean(Beanper), by(farm);

gen BeanperCI = BeanI/CI;
egen aBeanCI = mean(BeanperCI), by(farm);

gen Cornper = CornI/TI;
egen aCornper = mean(Cornper), by(farm);

gen CornperCI = CornI/CI;
egen aCornCI = mean(CornperCI), by(farm);

gen Sorghper = SorghI/TI;
egen aSorghper = mean(Sorghper), by(farm);
```

```
gen SorghperCI = SorghI/CI;
egen aSorghCI = mean(SorghperCI), by(farm);

gen MCropper = MCropI/TI;
egen aMCropper = mean(MCropper), by(farm);

gen MCropperCI = MCropI/CI;
egen aMCropCI = mean(MCropperCI), by(farm);

generate FamLiv =  unpaid;

/* Value of Farm Production (VFP)*/

gen VFP = v005;
egen aVFP = mean(VFP), by(farm);

/* Keep Southeast KS Farms*/

drop if farm < 60000000;
drop if farm == 60403500; /* large v071 poultry purchase value*/

/*Sorting by Farm Type and size Size*/

keep if aCIper >.50;

keep if aVFP < 100000;

keep if aVFP >= 100000 & aVFP < 250000;

keep if aVFP >= 250000 & aVFP < 500000;
```

```
keep if aVFP >= 500000;

gen NumFarms = _N/13;

sum;

/*Keeping only relevant variables for spreadsheet*/

keep farm year AFI - NFI FamLiv aVFP;

sum;
```

Appendix B - Total Farmer Paid Premium

Appendix B presents the equation to be used if AGR-Lite were being evaluated as a umbrella (wrap around) policy.

(21) $\mathbf{TFPP_{kj}} = [AGRL_{kj} - MIN\{\sum (LOIP_{kj}), 0.5(AGRL_{kj}\} x\ PRR_{kj}] \times (1- SR_{kj}*) + \$30$[1]

$TFPP_{kj}$ Total Farmer Paid Premium for insurance year k = 0 for farm j

$LOIP_{kj}$ Liability from Other Insured Products for insurance year k = 0 for farm j

*The AGR Liability (AGRL) will be reduced by the accumulated liability from other insurance products offered under the authority of the ACT which compensates producers for damage or loss. Total reduction is capped at 50 percent of AGRL.

PRR_{kj} Premium Rate for insurance year k = 0 for farm j

SR_{kj} Subsidy Rate for insurance year k = 0 for farm j

*Government will pay (subsidize) a portion of premium for AGR-Lite policy corresponding to producer elected coverage level:

- 65% Coverage Level = 59% Subsidy
- 75% Coverage Level = 55% Subsidy
- 80% Coverage Lev el = 48% Subsidy

[1]Each AGR-Lite contract includes an administrative fee equal to $30.

Appendix C - Southeast Kansas Farms

Appendix C summarizes SE Kansas farms by county number, county name, and the corresponding farm number by county.

04 Crawford - 15
05 Montgomery - 10
08 Cowley - 24
09 Butler - 5
10 Cherokee - 15
11 Labette - 12
17 Bourbon - 10
21 Franklin - 20
22 Neosho - 11
24 Allen - 11
27 Wilson - 13
29 Osage - 10
31 Miami - 13
32 Greenwood - 5
44 Coffey - 5
49 Linn - 10
52 Anderson - 11
63 Chautauqua - 11
68 Elk - 15
72 Woodson – 22

Appendix D - AGR Worksheets

The following figures include worksheets to be used as an aid to producers in the AGR-Lite filing process. Figures D.1, D.2, D.3, and D.4 provide worksheets for figuring AFI, AE, EI, and eligibility of agricultural program payments.

Figure D. 1 Allowable farm income worksheet for calculating AGR

ALLOWABLE INCOME WORKSHEET
(For AGR Revenue Report)

ADJUSTMENT CODES			
A	Line specifically excluded	F	Disaster payments
B	Cost of post-production operations	G	Net gain from commodity hedges
C	Co-op dividends not directly related	H	Not directly related to production
D	Agricultural program payments	I	Other - explain the adjustment made
E	Crop insurance payments		

Schedule F Part I - for cash basis taxpayers (accrual taxpayers use part III)					
Line Number	**Description Tax Year:_____**	**(1) Amount From Schedule F**	**(2) AGR Income Adjustment**	**(3) Code**	**(4) AGR Allowable Income**
1	Sales of items bought for resale				
2	Cost or other basis of line 1				
3	line 1 less line 2				
4	Sales of items you raised				
Less: adjustments for "post production"					
4.1					
4.2					
4.3					
4.4					
4.5					
4.6					
4.7					
4.8					
5b	Taxable coop distributions				
6b	Taxable AG program payments				
7a	CCC loans under election				
7c	Taxable CCC loans forfeited				
8b	Taxable crop ins proceeds				
8d	Taxable deferral from prior year				
9	Custom hire income				
10	Other income (details below)				
10.1					
10.2					
10.3					
10.4					
10.5					
10.6					
10.7					
10.8					
(5) Subtotals: Total Columns (1), (2) and (4).					
(6) Total Adjustments: Subtotal Col. (2)					
(7) Allowable AGR Income: Subtotal Col. (1) minus Total Adjustments Item (6). Must Equal Subtotal Col. (4)					

Figure D. 2 Allowable expense worksheet for calculating AE

ALLOWABLE EXPENSE WORKSHEET

ADJUSTMENT CODES		*Carry cost of post-production adjustments to the Income Worksheet.*
A	Line specifically excluded	
B	Cost of post-production operations	
H	Not directly related to production	
I	Other – explain the adjustment made	

Schedule F Part II- for all taxpayers						
Line Number	Description Tax Year:_____	(1) Amount From Schedule F	(2) Post Production Expenses	(3) Code	(4) AGR Expense Adjustment	(5) AGR Allowable Expense
12	Car and truck expenses					
13	Chemicals					
14	Conservation expenses					
15	Custom Hire					
16	Depreciation and Sec. 179					
17	Employee benefit programs					
18	Feed purchased					
19	Fertilizers and lime					
20	Freight and trucking					
21	Gasoline, fuel and oil					
22	Insurance					
23a	Mortgage interest					
23b	Other interest					
24	Labor hired					
25	Pension and profit-sharing					
26a	Equipment rent/lease					
26b	Other rent/lease					
27	Repairs and maintenance					
28	Seeds and plants					
29	Storage and warehousing					
30	Supplies purchased					
31	Taxes					
32	Utilities					
33	Veterinary, breeding & medicine					
34a						
34b						
34c						
34e						
34f						
(6) **Subtotals:** Total Columns (1), (2), (4), and (5).						
(7) **Total Adjustments:** Add Subtotals of Cols. (2) and (4)						
(8) **Allowable AGR Expenses:** Subtotal Col. (1) minus Total Adjustments Item (7) . Must Equal Subtotal Col. (5)						

Figure D. 3 Annual farm report to be submitted at the beginning of each insurance year

FCI-821 AGR (12-2003)	U. S. DEPARTMENT OF AGRICULTURE Federal Crop Insurance Corporation ANNUAL FARM REPORT	1. IRS Accounting Method? Cash ☐ Accrual ☐	2. Insurance Year:
3. PRODUCER INFORMATION: Type of Tax Entity: Phone Number: SSN ☐ EIN ☐	4. AGENCY INFORMATION: Policy No.: Phone Number: Agent Code:	5. State(s): County(ies):	6. Will any listed commodity also be insured under another insurance policy? If yes, list the commodity and contract number(s).

ADJUSTED GROSS REVENUE (AGR) REPORT			INTENDED COMMODITY REPORT						TOTAL VALUE BY COMMODITY
TAX YEAR 7	ALLOWABLE INCOME 8	ALLOWABLE EXPENSES 9	COMMODITY NAME/CODE 12A	NO. YEARS PRODUCED 13	INTENDED AMOUNT ACRES, ETC. 14A	INTENDED AMOUNT YIELD 14B	TOTAL AMOUNT 15	EXPECTED VALUE 16	DOLLARS 17
TOTAL	10A.	10B.							
AVERAGE	11A.	11B.	12B. TOTAL NUMBER COMMODITIES:				18. TOTAL EXPECTED INCOME:		

19A. INDEXED INCOME:	19B. APPROVED EXPENSES:	20. PRELIMINARY AGR:	21. APPROVED AGR: (Company use only)

22 REPORT OF CHANGES:

Have there been any changes in tax entity or changes in crops/crop mix, intended use of a crop, marketing plans, ownership, business structure, size of operation, farming practice, type of farming activity, accounting methods, or any other change that alters farm income from the average (historic) income? If yes, describe this change(s) and its expected effect on adjusted gross revenue, by applicable commodity. (Explain in Narrative and on an attachment if necessary)

Narrative:

(Continued on Reverse)

Figure D. 4 Agricultural program payment eligibility

Agricultural Program Payments

Agricultural Program Payments	Allowable Income	Income for Claims
Loan Deficiency Payment (LDP)	No	No
Production Flexibility Contracts Agricultural Market Transition Act (AMTA)	No	No
Direct Counter-Cyclical Payments (DCP) (Replaces Production Flexibility Contracts and MLA)	No	No
Conservation Reserve Program (CRP)	No	No
Conservation Reserve Enhancement Program (CREP)	No	No
FSA Loans (including Emergency Loans)	No	No
Noninsured Crop Disaster Assistance Program (NAP)	No	Yes
Ad Hoc Disaster Payments	No	No
Market Loss Assistance Program (MLA)	No	No
Commodity Loans - Commodity Credit Corporation (CCC)	Yes	Yes
Sugarbeet - Payment in Kind	Yes	Yes **
Marketing Orders - Cranberry, Tart Cherries	Yes	Yes **

** The payment is considered allowable income; however, the revenue lost due to complying with the PIK program or the marketing order is not covered.

Appendix E - Table Interpretation

The following provides an explanation for each row and column of Table 4.1 and similar tables. Titles for each statistic in there have been bolded for ease of identification.

Average Mean

Equals the average of the 219 farms mean calculated for each farm from the seven year distribution. In Table 4.1 the average AGRC for across 219 farms was $203,236.

Minimum is the lowest average across 219 farms. In Table 4.1 the farm that had the lowest average AGRC was $15,560.

Maximum is the largest average across 219 farms. In Table 4.1 the farm that had the largest average AGRC was $1,160,123.

Average Standard Deviation

Equals the average of the 219 farms standard deviations calculated using the seven year distribution.

Minimum is the lowest standard deviation of the 219 farms.

Maximum is the largest standard deviation from the 219 farms

Average CV

Equals the average of the 219 farms CVs calculated for each farm using the mean and standard deviation from the seven year distribution

Minimum is the lowest CV from the 219 farms

Maximum is the largest CV from the 219 farms

Average Minimum

Calculates the average of the 219 farms minimum observations identified in the seven year distribution

Minimum is the lowest minimum from the 219 farms

Maximum is the largest minimum from the 219 farms

Average Maximum

Equals the average of the 219 farms maximum observations identified in the seven year distribution

Minimum is the smallest maximum observation from the 219 farms

Maximum is the largest maximum observation from the 219 farms

The following discussion explains the headings for Table 4.1 and similar tables.

AGRC w/o AGR-Lite

Reports the previously mentioned statistics assuming AGRC without AGR-Lite, from Equation 18.

NFI w/o AGR-Lite

Reports the previously mentioned statistics assuming use of NFI without participation in AGR-Lite, calculated in Equation 22.

AGRC w/ AGR-Lite

Reports the previously mentioned statistics assuming use of AGRC with consideration to AGR-Lite premiums and indemnities, located in Equation 24.

NFI w/ AGR-Lite

Reports the previously mentioned statistics for NFI with consideration to AGR-Lite premiums and indemnities, illustrated in Equation 23.

Average AGRC Change

Equlas the average of the 219 farms AGRC changes (with AGR-Lite minus without AGR-lite) in each statistic (mean, standard deviation, CV, minimum, and maximum) calculated using the results from the seven year distribution.

Average NFI Change

Equals the average of the 219 farms NFI changes (with AGR-Lite minus without AGR-Lite) in each statistic (mean, standard deviation, CV, minimum, and maximum) calculated using the results from the seven year distribution.

AGRC Percent Change

Equals the percent change in AGRC (1-(AGRC w/ AGR-Lite / AGRC w/o AGR-Lite)) for each statistic in the table.

NFI Percent Change

Equals the percent change in NFI (1-(NFI w/ AGR-Lite / NFI w/o AGR-Lite)) for each statistic in the table.

Appendix F - Beef Standard Deviation Explanation

This appendix provides an example of the increase in standard deviations observed in beef farms. Tables F.1 and F.2 provide an example of a beef farm which, with participation in AGR-Lite, increased standard deviation for Adjusted Gross Revenue to Count (AGRC) and Net Farm Income (NFI). The first two columns provide AFI and inventory adjustments which generate AGRC prior to participation in AGR-Lite. The fourth column reports AGRC for each year with participation in AGR-Lite with consideration to indemnities and corresponding premium costs. All remaining columns (Expected Income (EI), Expense Reduction (ER), liability, Loss Inception Point (LIP), Indemnity (ID), and premium) were included to provide the necessary detail to illustrate how participation in AGR-Lite can in fact lead to standard deviation increases. Evident in Table F.1 is the increase in standard deviation with participation in AGR-Lite from $77,828 to $94,634. As discussed in earlier text AGR-Lite is not necessarily resulting in the largest impact to low years, which would be expected. Over the seven years, 2001 marked the lowest year ($185,820). An indemnity was received in 2001, which is intuitive given it was the lowest year; however the indemnity received was completely offset by the corresponding cost of insurance (premium). That said the lowest year will fall even lower which contradicts the essence of insurance. To illustrate, consider the Cumulative Distribution Function (CDF) income distribution in Figure F.1. It is expected that the presence of insurance will truncate the CDF by shrinking the distribution to fall inside of the CDF without AGR-Lite. As the CDF reveals, participation in AGR-Lite (dotted line) moves further to the left, increasing the downside potential. On the other

hand 2000 marked the highest year and surprisingly generated a $47,830 claim which increased the overall maximum. Figure F.1 illustrates the increase in maximum as the dotted line moves beyond (shift to the right) the solid line (without AGR-Lite). This is partially justified by the much higher LIP in 2000 compared to 2001. Nevertheless, by lowering the initial minimum and increasing the initial maximum it is intuitive that as the overall range of the distribution widens, we would expect an increase in standard deviation. Similar findings are found when looking at NFI (Table F.2 and corresponding Figure F.2).

Figures F.3 and F.4 illustrate what would be expected to occur with the presence of insurance. Using actual farm data from beef farms, AGRC and NFI distributions were used to generate CDFs with and without AGR-Lite. These graphs clearly indicate CDFs with AGR-Lite fall within the CDFs without AGR-Lite. This suggests an increase in minimum and reduction in maximum, which is expected from insurance. Furthermore the probability of generating lower values, located on the vertical axis, decline for AGRC and NFI (Figures F.3 and F.4), compared to Figures F.1 and F.2. Tables F.3 and F.4 were included to reveal AGRC and NFI distributions used to generate CDFs.

Table F. 1 Standard deviation increase example for Adjusted Gross Revenue to Count (AGRC)

	AFI[1]	Inventory Adjustment[2]	AGRC w/o AGR-Lite[3]	AGRC w/ AGR-Lite[4]	AGRC Change	EI[5]	ER[6]	Liability[7]	LIP[8]	ID[9]	Premium[10]
1999	$486,788	-$130,610	$356,178	$436,978	$80,800	$632,661	$0	$427,046	$474,496	$106,486	$25,686
2000	$548,477	-$147,734	$400,743	$424,002	$23,259	$605,183	$0	$408,499	$453,887	$47,830	$24,571
2001	$374,320	-$188,500	$185,820	$180,425	-$5,395	$567,236	$293,351	$382,884	$205,414	$17,635	$23,030
2002	$352,826	-$4,800	$348,026	$325,879	-$22,147	$545,497	$264,137	$368,211	$211,020	$0	$22,147
2003	$283,834	-$32,750	$251,084	$230,856	-$20,228	$498,233	$235,066	$336,307	$197,375	$0	$20,228
2004	$245,352	$116,230	$361,582	$343,266	-$18,316	$451,125	$175,280	$304,509	$206,883	$0	$18,316
2005	$351,163	$28,050	$379,213	$362,597	-$16,616	$409,249	$99,527	$276,243	$232,292	$0	$16,616
Average	$377,537	-$51,445	$326,092	$329,143	$3,051	$529,883	$152,480	$357,671	$283,052	$24,564	$21,513
Standard Deviation	$107,025	$108,997	$77,828	$94,634	$37,738	$81,271	$121,762	$54,858	$124,345	$40,237	$3,300
Coefficient of Variation	0.28	-2.12	0.24	0.29	12.37	0.15	0.80	0.15	0.44	1.64	0.15
Minimum	$245,352	-$188,500	$185,820	$180,425	-$22,147	$409,249	$0	$276,243	$197,375	$0	$16,616
Maximum	$548,477	$116,230	$400,743	$436,978	$80,800	$632,661	$293,351	$427,046	$474,496	$106,486	$25,686

[1]Allowable Farm Income (AFI) reflects AFI for each year calculated using Equation 1 in the mathematical explanation.

[2]Inventory adjustment was calculated by adding accrual adjustments of Inventories (IN) and Accounts Receiable (AR)

[3]Adjusted Gross Revenue to Count (AGRC) w/o AGR-Lite calculates AGRC by subtracting Inventory adjustments from AFI.

[4]Adjusted Gross Revenue to Count (AGRC) w/ AGR-Lite calculates AGRC with consideration to AGR-Lite indemnities and premium costs. Refer to Equation 24 for the mathematical explanation

[5]Expected Income (EI) reflects the projected income for the upcoming insurance year and is reported on the annual farm report Figure D.3. Due to KFMA data limitations EI was assumed to equal the 5-year average AGR (AGRA). As such the EI became the Approved Adjusted Gross Revenue (AAGR)

[6]Expense Reduction (ER) is the amount by which Approved Adjusted Gross Revenue (AAGR) will be reduced because Allowable Expenses (AE) for the current year fell below 70%. Refer to Equations 13, 14, and 15 for a mathematical explanation.

[7]Liability was calculated using Approved Adjusted Gross Revenue (AAGR), 75% coverage level, and 90% payment rate. Refer to Equation 6 for the mathematical explanation.

[8]Loss Inception Point (LIP) identifies the point at which indemnification occurs. Refer to Equation 17 for the mathematical explanation.

[9]Indemnity (ID) reports the indemnity for each year given the coverage level and payment rate. Refer to Equation 20 for the mathematical explanation. The difference between Loss Inception Point (LIP) and Adjusted Gross Revenue to Count (AGRC), if positive, is the amount eligible for indemnification. Multiply the eligible amount by the selected payment rate (90% in this scenario) to determine the indemnity amount.

[10]Reflects the associated cost of AGR-Lite assuming application of Actuarially Fair Average Rate for farms with Indemnities (AFARI) (6.0% rate). Multiply AFARI by liability to obtain the resulting premium.

Table F. 2 Standard deviation increase example for Net Farm Income (NFI)

	NFI w/o AGR-Lite	NFI w/ AGR-Lite[1]	Change	Liability[2]	LIP[3]	ID[4]	Premium[5]
1999	$15,023	$95,823	$80,800	$427,046	$474,496	$106,486	$25,686
2000	$82,793	$106,052	$23,259	$408,499	$453,887	$47,830	$24,571
2001	-$69,360	-$74,755	-$5,395	$382,884	$205,414	$17,635	$23,030
2002	-$19,221	-$41,368	-$22,147	$368,211	$211,020	$0	$22,147
2003	-$51,347	-$71,575	-$20,228	$336,307	$197,375	$0	$20,228
2004	$56,946	$38,630	-$18,316	$304,509	$206,883	$0	$18,316
2005	$117,061	$100,445	-$16,616	$276,243	$232,292	$0	$16,616
Average	$18,842	$21,893	$3,051	$357,671	$283,052	$24,564	$21,513
Standard Deviation	$69,950	$82,743	$37,738	$54,858	$124,345	$40,237	$3,300
Coefficient of Variation	3.712	3.779	12.369	0.153	0.439	1.638	0.153
Minimum	-$69,360	-$74,755	-$22,147	$276,243	$197,375	$0	$16,616
Maximum	$117,061	$106,052	$80,800	$427,046	$474,496	$106,486	$25,686

[1]Net Farm Income (NFI) w/ AGR-Lite calculates NFI with consideration to AGR-Lite indemnities and premium costs. Refer to Equation 24 for the mathematical

[2]Liability was calculated using Approved Adjusted Gross Revenue (AAGR), 75% coverage level, and 90% payment rate. Refer to Equation 6 for the mathematical explanation.

[3]Loss Inception Point (LIP) identifies the point at which indemnification occurs. Refer to Equation 17 for the mathematical explanation.

[4]Indemnity (ID) reports the indemnity for each year given the coverage level and payment rate. Refer to Equation 20 for the mathematical explanation. The difference between Loss Inception Point (LIP) and Net Farm Income (NFI), if positive, is the amount eligible for indemnification. Multiply the eligible amount by the selected

[5]Reflects the associated cost of AGR-Lite assuming application of Actuarially Fair Average Rate for farms with Indemnities (AFARI) (6.0% rate). Multiply AFARI by liability to obtain the resulting premium.

Figure F. 1 Cumulative Distribution Function (CDF) of Adjusted Gross Revenue to Count (AGRC) with and without participation in AGR-Lite

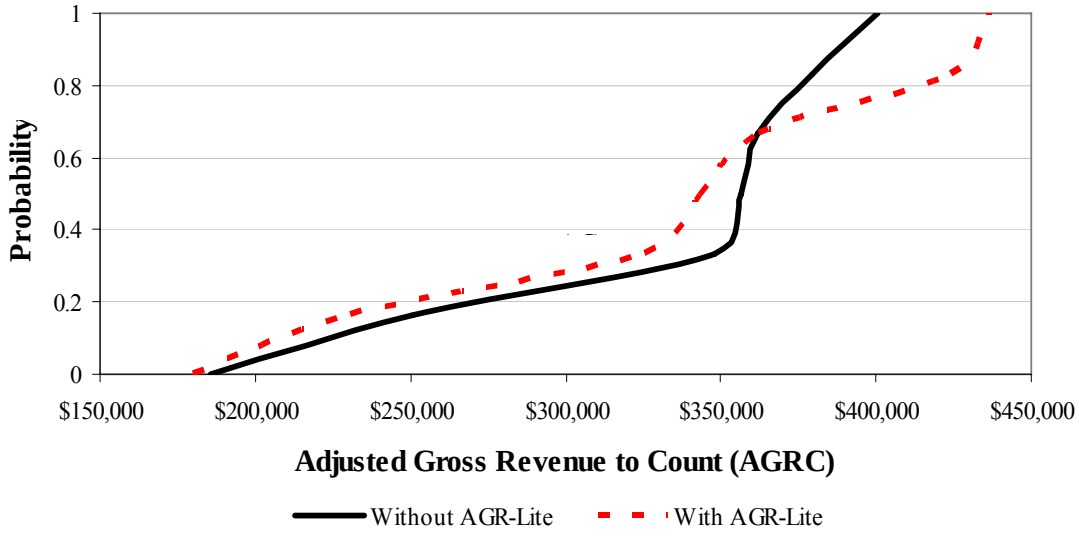

Figure F. 2 Cumulative Distribution Function (CDF) of Net Farm Income (NFI) with and without participation in AGR-Lite

Figure F. 3 Cumulative Distribution Function (CDF) of Adjusted Gross Revenue to Count (AGRC) with and without participation in AGR-Lite (Expected)

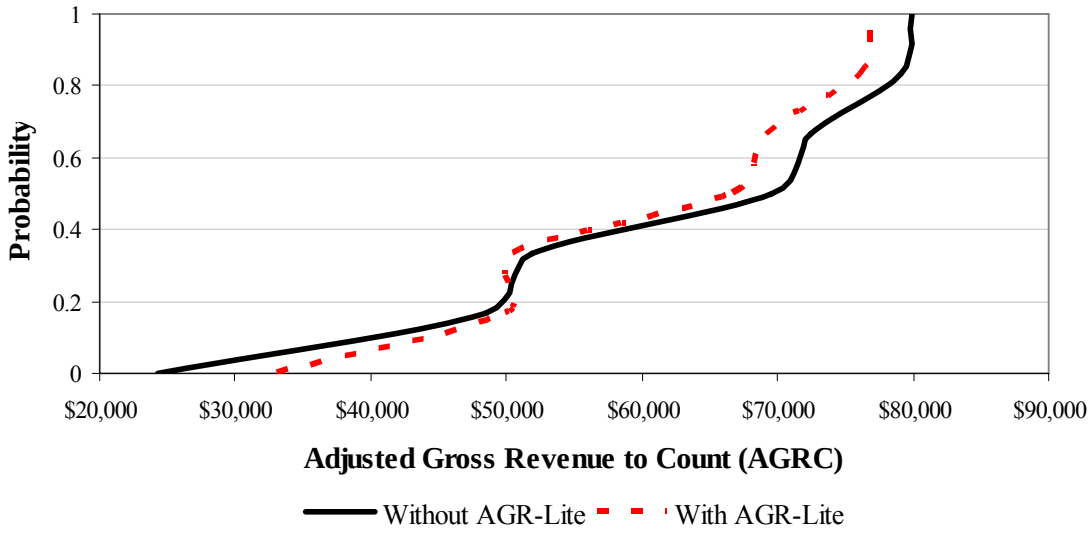

Table F. 3 Adjusted Gross Revenue to Count (AGRC) distributions with and without AGR-Lite over 1999 to 2005 period (Expected)

	AGRC w/o AGR-Lite	AGRC w/ AGR-Lite	Change
1999	$79,030	$76,024	-$3,007
2000	$72,506	$69,108	-$3,398
2001	$69,532	$66,637	-$2,895
2002	$51,829	$49,899	-$1,930
2003	$79,894	$77,028	-$2,865
2004	$48,378	$50,549	$2,172
2005	$24,290	$33,164	$8,874
Average	$60,780	$60,344	-$436
Standard Deviation	$20,322	$16,250	-$4,072
Coefficient of Variation	0.334	0.269	-0.065
Minimum	$24,290	$33,164	$8,874
Maximum	$79,894	$77,028	-$2,865

Figure F. 4 Cumulative Distribution Function (CDF) of Net Farm Income (NFI) with and without participation in AGR-Lite (Expected)

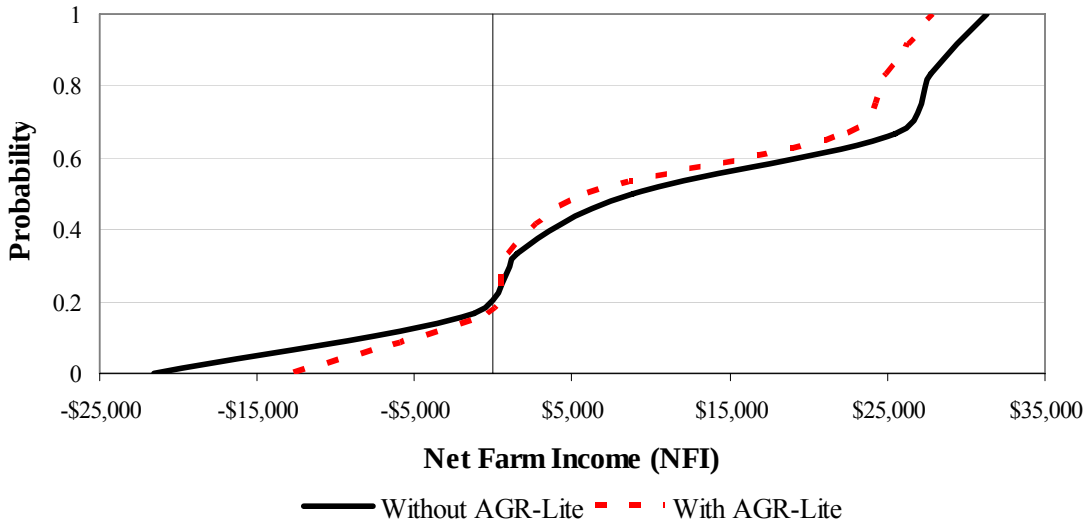

Table F. 4 Net Farm Income (NFI) distributions with and without AGR-Lite over 1999 to 2005 period (Expected)

	NFI w/o AGR-Lite	NFI w/ AGR-Lite	Change
1999	$25,488	$22,481	-$3,007
2000	$31,270	$27,872	-$3,398
2001	$8,846	$5,951	-$2,895
2002	$1,472	-$458	-$1,930
2003	$27,729	$24,864	-$2,865
2004	-$1,249	$923	$2,172
2005	-$21,548	-$12,674	$8,874
Average	$10,287	$9,851	-$436
Standard Deviation	$19,157	$15,375	-$3,782
Coefficient of Variation	1.862	1.561	-0.302
Minimum	-$21,548	-$12,674	$8,874
Maximum	$31,270	$27,872	-$3,398