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ECONOMICS AND MARKETING

Are Added Land and New Producer Provisions in Crop Insurance Vulnerable to Abuse? The Case of Insured Texas Cotton Producers

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ABSTRACT

Reducing vulnerabilities in the crop insurance program is important to the welfare of Texas cotton (*Gossypium hirsutum* L.) producers because excessive losses due to the abuse of these vulnerabilities may result in producer premium increases in the future. Cotton farmers will benefit from identifying and reducing program vulnerabilities because it assures that the safety-net structure in U.S. agriculture remains intact and cotton farmers will remain competitive in the world market. The objective of this study was to analyze the added land and new producer provisions in crop insurance and assess whether these provisions are vulnerable to abuse. Based on the current structure of the provisions, the vulnerability of the added land and new producer provisions primarily stems from the informational advantage held by the producer with regards to the inherent productive capacity of his land. A descriptive statistical analysis of crop insurance data from insured Texas cotton producers showed statistically higher loss ratios (loss ratio = indemnity/premium) for producers utilizing the added land and new producer provisions relative to producers using traditional actual production history. The results of this study suggest that the added land and new producer provisions are vulnerable to abuse and have prompted policy makers to continually re-assess, re-evaluate, and actually adopt measures to mitigate this vulnerability.

Since the early 1990s, the need to reduce fraud, waste, and abuse in the U.S. crop insurance program has been a recognized priority of the United States Congress, the United States Department of Agriculture (USDA), and the USDA's Risk Management Agency (RMA). Past estimates reveal that approximately 5% of all crop insurance claims may be associated with fraud, waste, and/or abuse (US GAO, 1999). The crop insurance industry defines *fraud* as a false representation of a matter of fact taken to generate economic gain. Crop insurance fraud can include padding or inflating claims, falsifying an insurance application, hiding production, creating false claims, or intentionally taking action to create a claim. On the other hand, *abuse* takes place when an individual producer takes advantage of a special circumstance, errors, or loopholes inherent within the crop insurance policy. This definition of abuse is also commonly referred to as "program vulnerabilities" in the federal crop insurance community. Lastly, *waste* is defined as errors, usually unintentional, that are not discovered and, therefore, not corrected.

Given that abuse or "program vulnerability" is one of the major concerns of the federal crop insurance program, it is important to examine different crop insurance contract elements that may be vulnerable to abuse in order to develop effective strategies for mitigating and managing the abuse. This would reduce taxpayer dollars that are wasted on excessive indemnity payments. Analyzing and reducing program vulnerabilities is also important to the welfare of farmers in general, because excessive losses due to these vulnerabilities may lead to increases in producer premiums in the long run. An increase in producer premium is a logical actuarial response to the excessive losses that, to the insurer, reflects a higher risk and a higher cost of insuring crop production. If producer premiums are high, then crop insurance may no longer be a viable risk management tool for farmers. Overall, farmers will benefit from identifying and reducing program vulnerabilities because this endeavor assures that the safety-net structure in U.S. agriculture remains intact and U.S. farmers will remain competitive in the world market.

In 2000, Texas ranked second only to Kansas in the total number of crop insurance policies sold (175,883 policies). Texas cotton (*Gossypium*

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hirsutum L.) producers, in particular, accounted for about half of all the cotton insurance policies sold in the United States, and approximately 54% of all indemnities paid to U.S. cotton producers went to Texas cotton farmers in 2000 (USDA-RMA, 2002a). These figures indicate that Texas cotton producers rely heavily on crop insurance as a risk management tool. Therefore, it is important to analyze crop insurance program vulnerabilities for this highly insured area because the abuse of these vulnerabilities may impact the ability of Texas cotton producers to manage risk and survive in the very competitive cotton market.

Two contract elements that may be vulnerable to abuse in the crop insurance program are the added land and new producer provisions. There has been anecdotal evidence that these provisions have been abused in the past (See USDA-RMA, 2002c for examples of these cases). These two provisions can serve as starting points for better understanding of the incentives for abusing these crop insurance program vulnerabilities. The objective of this paper, therefore, is to analyze the added land and new producer provisions in crop insurance and assess whether these provisions are vulnerable to abuse.

Background of the added land and new producer provisions. The procedures for computing approved actual production history (APH) in crop insurance have provisions that allow insurance providers to make special yield determinations for producers adding more land into production and for new producers planting an insured crop for the first time (USDA-RMA, 2002b). The added land and new producer provisions allow producers to use either transitional yields (T-yields; estimated yields used in calculating approved APH when there is less than 4 years of actual yield for the insured crop) or yield histories from other farm units of the same crop, crop type, and practice to determine the yield guarantee for insurance.

Added land is defined as cropland acreage (irrespective of crops) added to the insured person's farming operation within the county for the current crop year (USDA-RMA, 2002b). The appropriate APH yield determination for added land primarily depends on whether the land is being added as a *separate* optional/basic unit or the land is being added to an *existing* optional/basic unit (Producers can insure their crop acreage either as a basic or optional unit. A basic unit is all insurable acreage of a crop in the county held by the insured under identical ownership. Optional units are subdivided basic units.). Land being added as a separate basic unit uses the variable T-yields to determine the yield guarantee, if there are no verifiable production records from other existing units of the same crop, type, and practice to be planted on the added land (A variable T-yield is an estimated yield primarily based on the county mean). Note that variable T-yields are set by the RMA and do not necessarily equal the land's true average yield. The term "variable" is used to differentiate it from the "simple average" T-yield that is based on yields of existing units.

If land is being added as a separate optional unit, then either a variable T-yield is used or a simple average (SA) T-yield from the existing units is used. A SA T-yield is just the average yield of all the insured units of the crop, type, and practice to be planted on the added land. A variable T-yield is used for determining the yield guarantee of added land as a separate optional unit if a different crop, type, or practice is going to be used in the added land.

If land is being added to either an existing optional or basic unit, then the actual yield for that unit is used to determine the yield guarantee. This is assuming that the added land will be used for the same crop, type, and practice as in the existing unit. If a new crop, type, and practice will be planted on the added land and there are no production records for this crop, type, and practice, then variable T-yields are used to determine the yield guarantee.

A new producer is a person (or entity) who has not been "producing the crop" in the county for more than *two* APH crop years. The term "producing the crop" refers to an individual who is actively engaged in farming for a share of an insured crop's production in the county. The approved yield to determine the yield guarantee of a new insured producer depends on whether he has produced the crop in the county before or not. An entity that has produced the crop more than two years is not eligible to claim new producer status. If the producer has produced the crop for two years or less, then the new producer uses the combination of actual yields and 100% of the applicable variable T-yield for the crop. Actual yields would be used for the one or two years the producer planted the crop and variable T-yields are used for the remaining years when the crop was not planted. If the producer has not planted the crop before, then the applicable variable T-yields are used to determine the APH yields. Note, however, that producers, who want to be classified as new producers, even though they have been producing the crop for more than two years, can request the RMA Reinsurance Organization to classify them as new producers if no production records are available for any of the land that the producer has planted.

Formation of a new entity (i.e. corporation, partnership, trust, etc.) comprised of one or more individuals does not automatically qualify the entity as a new producer. The individuals involved in the new entity must all have not previously planted the crop for more than two years for the new entity to be classified as a new producer. Dissolution of an entity comprised of one or more individuals also does not automatically qualify the individual(s) involved in the entity as new producers. If the dissolved entity previously produced the crop in the county for more than two years, then the individuals previously involved in the entity cannot claim new producer status.

Incentives for abusing the added land and new producer provisions. Neoclassical economic theory suggests that a crop producer deciding to abuse the added land and new producer provisions of crop insurance compares the magnitude of the potential utility gain from successful abuse with the costs of undertaking the abusive act plus the potential penalties if the abuse is detected. Given these costs and benefits, if the probability of successfully abusing the added land and new producer provision is sufficiently high to yield net gains in expected utility, then a producer is likely to abuse these provisions (Becker, 1968; Allingham and Sandmo, 1972; Srinivasan, 1973). Therefore, the key to understanding the economic incentives for abusing the added land and new producer provisions in crop insurance contracts is to know its relative benefits and costs.

The key factor that allows producers to benefit from abusing these provisions is the asymmetric information (or informational advantage) held by the producer with regards to the inherent productivity of the added land or the new land brought into production. If the inherent productivity of the added land or new land is lower than the estimated variable/SA T-yields, then indemnities will be triggered more frequently and producers will benefit from excess indemnities. On the other hand, the main costs of abusing the added land and new producer provisions are (1) the additional premiums required for using these provisions, (2) the transactions cost of abusing these provisions, (3) the potential penalties/punishment (if abuse is detected), and (4) the "moral" costs of abuse (Transaction costs are the effort and time spent by a producer to put together the necessary documents to take advantage of the provisions. Potential penalties/punishment may range from withholding indemnity payments to prison time, depending on the severity of the abuse detected. "Moral" cost of abuse is primarily the individual ethical cost to the producer undertaking the abuse [Tennyson, 1997]). In general, the costs associated with (1), (2), and (3) above may be minimal relative to the potential benefits from excess indemnities. On the other hand, the potential punishment for detected abuse may be a large potential cost to the producer taking advantage of the provisions, but historically it has been very difficult to detect these abuses. Therefore, the "expected" costs of these penalties may also be minimal since abuse will likely not be detected. But the RMA has started to adopt advanced technologies that may lead to a drastic improvement in detection methods and further leverage the productivity of the compliance division of the RMA.

In light of the discussion above, the expected benefits of abusing the added land and new producer provisions is likely to outweigh the expected costs. Hence, the present structure of the added land and new producer provisions may provide enough incentive for abuse because of the likelihood of getting positive expected net benefits from this act. The presence of these incentives makes these crop insurance contract elements "vulnerable" to abuse.

MATERIALS AND METHODS

If the added land and new producer provisions in crop insurance were indeed vulnerable to abuse, then available crop insurance data would show a statistically higher loss ratio (loss ratio = indemnity/premium) for producers using the added land or new producer provisions (relative to the loss ratio of producers using actual yield history). Even though a higher loss ratio is *suggestive* of the vulnerability of the added land and new producer provisions to abuse, a statistically higher loss ratio does *not* necessarily mean that abuse is actually taking place.

Crop insurance data from reinsurance year 2000 provided by RMA was used to determine if the loss ratios of producers using the added land or the new producer provisions are statistically higher than the producers using actual production history. The data used is only for Texas cotton producers covered by the traditional Multi-Peril Crop Insurance. The yield history data for 1996-1999 (reported in the yield records submitted in reinsurance year 2000) were used to determine if an individual unit used actual yield history or utilized the added land and new producer provisions. In particular, the four-year sequence of the reported "Yield Type" code in the period 1996-1999 was used as the primary indicator of how a particular producer is classified in reinsurance year 2000. Descriptions of the pertinent yield type codes are provided in Table 1.

Using the four-year yield type code sequence, an individual unit can be classified as utilizing: actual yields (ACT), added land provisions with SA T-yields (ALS), added land provisions with variable T-yields (ALV), and new producer provisions with variable T-yields (NP). In consultation with RMA personnel, a detailed set of rules for classifying individual units into the categories above were developed (Table 2). Once the insured units are classified, the premium and indemnity received for each category were aggregated at the county level and a loss ratio for the county was calculated. This aggregation was required since RMA does not allow public access to and public reporting of unit-level data or farm-level data because of its concern about privacy issues. Thus, county-level loss ratios of the added land categories (ALS and ALV) and the new producer category (NP) were compared to the corresponding county-level loss ratio of the actuals category (ACT) in the analysis. Descriptive statistics for the county-level loss ratios of the different categories being compared are reported in Table 3. All statistical analysis used in this study were undertaken using the STATA software (Stata Corporation, Release 7.0, College Station, TX).

The first step in statistically comparing the county-level loss ratios is to determine if the data sets being compared are normally distributed and

Table 1. Yield type codes used for classifying insured units as actual yields (ACT), added land using simple average T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP)

Yield Type Code	Description
A	Actual yield
C	Special yield for added land intended for a specific crop practice, type, and variety, using an approved APH yield from another existing (reference) unit for the same practice, type, and variety
E	80% of T-yield
H	Special T-yield for new producers
I	Special T-yield for new producers
L	Special yield for added land for a specific crop practice, type, and variety, using an approved APH yield from another existing (reference) unit for the same practice, type, and variety
N	90% of T-yield
S	65% of T-yield
T	100% of T-yield used for added land for a specific crop practice, type, and variety, where there is no existing unit (for the same crop practice, type, and variety) that can be used to determine an APH yield.
Z	Zero acres planted (land lay fallow)

Table 2. Criteria for classifying insured units as utilizing actual yields (ACT), added land provisions with simple average T-yields (ALS), added land provisions with variable T-yields (ALV), and new producer provisions with variable T-yields (NP)

Category	Criteria[z]
Actual yields (ACT)	Individual units with strictly 4 years of code A. (experienced producers)
Added land using SA T-yields (ALS)	Individual units with at least one C or L in the 4 previous years. (C & L can only be combined with A, T, or Z)
Added land using variable T-yields (ALV)	Individual units with at least one T, N, E, or S in the 4 previous years (T, N, E, or S can only be combined with A or Z).
New producer using variable T-yields (NP)	Individual units with at least one I or H in the 4 previous years. (I or H can only be combined with A, T, or Z)

[Z] The yield type codes used in the table above (C, L, A, T, E, S, I, H, N, and Z) are defined in Table 1.

Table 3. Descriptive statistics of county-level loss ratio data for Texas cotton producers classifying insured units as actual yields (ACT), added land using simple average T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP) in 2000

A. Counties with cotton producers in the ALV and ACT categories		
Statistic	**ALV**	**ACT**
Number of counties	**72**	**72**
Mean	**1.51**	**1.13**
Median	**1.44**	**0.84**
Standard deviation	**1.03**	**0.94**
Skewness	**1.28**	**1.51**
Kurtosis	**5.58**	**5.62**
B. Counties with cotton producers in the ALS and ACT categories		
Statistic	**ALS**	**ACT**
Number of counties	**17**	**17**
Mean	**2.25**	**1.18**
Median	**2.31**	**0.68**
Standard deviation	**1.41**	**1.19**
Skewness	**0.10**	**1.67**
Kurtosis	**2.62**	**5.13**
C. Counties with cotton producers in the NP and ACT categories		
Statistic	**NP**	**ACT**
Number of counties	**65**	**65**
Mean	**2.31**	**1.15**
Median	**2.02**	**0.84**
Standard deviation	**1.38**	**0.98**
Skewness	**1.55**	**1.58**
Kurtosis	**6.11**	**5.54**

have equal variances. This is done to ascertain whether standard parametric procedures (e.g. t-tests) can be used for comparing the data sets. Tests of normality using the procedures suggested by Shapiro and Wilk (1965), Shapiro and Francia (1972), and D'Agostino et al. (1990) are used in this study. Bartlett's test and the more robust Levene's test are then used to determine if there is equality of variances in the samples being compared (Levene, 1960; Brown and Forsythe, 1974; Caroll and Schneider, 1985; Snedcor and Cochran, 1989). If the data is deemed normal and have equal variances, then standard parametric techniques can be used. Otherwise, non-parametric techniques such as the Wilcoxon-Mann-Whitney's rank-sum test/median test and the Kolmogorov-Smirnov equality of distributions test should be used.

The Wilcoxon-Mann-Whitney test can show whether two independent samples are drawn from populations with the same distribution (Wilcoxon, 1945; Mann and Whitney, 1947). This test can be tailored to examine equality of two means or two medians when the normality assumptions are violated. If the distributions are not symmetrical, then testing for equality of medians is more appropriate (Sprent, 1993). The Wilcoxon-Mann-Whitney test gives us an indication whether the medians of two data sets are drawn from the same population (i.e. medians are statistically different), but it does not give an estimate of the direction and magnitude of the difference. The nonparametric Hodges-Lehmann procedure for estimating shift parameters can be used to extend the Wilcoxon-Mann-Whitney test and estimate the magnitude of the difference between the means/medians (Hodges and Lehman, 1963).

The Kolmogorov-Smirnov test, on the other hand, is used to test whether two independent distributions of continuous, unbinned numerical data are different (Conover, 1999). For example, the Kolmogorov-Smirnov test can indicate whether the distribution of county-level loss ratios for the ALV category is different from the distribution of the ACT category. This means that hypotheses for the Kolmogorov-Smirnov test are not rooted in a mean or median (as in the Wilcoxon-Mann-Whitney test), which implies that a statistical difference between the distributions being compared may be due to a variety of reasons (i.e. difference in means, standard deviations, skewness, kurtosis, etc.). The Kolmogorov-Smirnov test does not provide any insight as to what caused the difference in the distributions. The advantage of the Kolmogorov-Smirnov test, on the other hand, is the fact that it does not impose normality and equality of variance assumptions for the test to be valid.

RESULTS AND DISCUSSION

The normality tests suggest that all of the data sets are non-normally distributed ($P \leq 0.05$), except for the county-level loss ratios in the ALS category (Table 4). The Levene tests indicate that we cannot reject the equality of variances among the samples being compared (ALV vs. ACT, ALS vs. ACT, and NP vs. ACT) at the 5% level of significance (Table 5). The Bartlett tests also indicated that the data sets comparing ALV to ACT and ALS to ACT have equal variances ($P \leq 0.05$), but the data sets comparing NP and ACT have unequal variances (Table 5). This may be due to the sensitivity of Bartlett's test to departures from non-normality. That is, if samples come from non-normal distributions, then Bartlett's test may simply be testing for non-normality. The Levene test is more reliable in this regard.

Based on the results above, we can reasonably assert that the data sets being compared generally have non-normal distributions and equal variances. The non-normality of the data suggests that nonparametric techniques (i.e. the Wilcoxon-Mann-Whitney test, Hodges-Lehmann procedure, and Kolmogorov-Smirnov test), which are free of distributional assumptions, would be the best way to test whether the county level loss ratios of the added land categories (ALS and ALV) and the new producer category (NP) are statistically different from the corresponding county-level loss ratio of the actuals category (ACT). The Wilcoxon-Mann-Whitney test indicated that the distributions of the county-level loss ratios of the ALV, ALS, and NP categories were statistically different from the corresponding county-level loss ratios of the ACT category (Table 6). Specifically, the medians of the ALV, ALS, and NP county-level loss ratios were statistically different ($P \leq 0.05$) from the county-level ratios of the ACT category. The Hodges-Lehmann procedure revealed that median county-level loss ratios of the ALV, ALS, and NP categories are statistically higher than the median county-level loss ratio of the corresponding ACT category (Table 6). The Kolmogorov-Smirnov tests further supported the findings from the Wilcoxon-Mann-Whitney test (Table 7). The results from the Kolmogorov-Smirnov directional hypotheses tests indicates that the distribution of the county-level loss ratio data from the ALV, ALS, and NP categories were higher ($P \leq 0.05$) than the distribution of the county-level loss ratios from the ACT category. The distributions of ALV, ALS, and NP were, therefore, statistically different from the distribution coming from the corresponding ACT category.

The added land and the new producer provisions may be vulnerable to abuse since the results above suggest that the difference between the loss ratios of the added land and new producers were statistically higher than the loss ratios of the producers using actual production history. This means that the differences in loss ratios between producers using the added land/new producer provisions and producers using actual yield history seem to be a systematic phenomena, rather than random occurrences.

Note that the results of the descriptive analysis above are suggestive of the vulnerability of the added land and new producer provisions. The analysis above is a simple and straightforward descriptive approach that assumes the groups under consideration are comparable. It is important to realize this assumption and its implications for the results above. The approach above, for example, did not account for the differences in coverage levels of the insured producers, the unit structure chosen by the producers (e.g. optional vs. basic vs. enterprise), the possibility of biased T-yields, and/or actual inexperience of added land and new producers. These factors in turn may have caused legitimate differences in the groups aside from the hypothesized abuse of the added land and new producer provisions, but the data

Table 4. Results of the tests of normality for the loss ratio data of Texas cotton producers classifying insured units as actual yields (ACT), added land using simple average T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP)

Shapiro-Wilk test[z]		
Comparisons	V statistic	z-value
A. ALV vs. ACT		
ALV	5.63	3.76**
ACT	8.74	4.72**
B. ALS vs. ACT		
ALS	0.79	-0.47
ACT	4.52	3.01**
C. NP vs. ACT		
NP	7.37	4.32**
ACT	9.14	4.79**

Shapiro-Francia test[z]		
Comparisons	V’ statistic	z-value
A. ALV vs. ACT		
ALV	6.22	3.47**
ACT	9.69	4.26**
B. ALS vs. ACT		
ALS	0.80	-0.40
ACT	5.21	2.95**
C. NP vs. ACT		
NP	8.49	3.99**
ACT	10.11	4.30**

D’Agostino (skewness/kurtosis) test[z]			
Comparisons	Skewness	Kurtosis	Joint skewness/kurtosis
A. ALV vs. ACT			
ALV	1.28**	5.58**	18.65**
ACT	1.51**	5.62**	21.50**
B. ALS vs. ACT			
ALS	0.10	2.62	0.07
ACT	1.67**	5.13*	10.87*
C. NP vs. ACT			
NP	1.55**	6.11	21.54**
ACT	1.58**	5.54	20.77**

[z] Shapiro and Wilk, Shapiro and Francia, and D’Agostino tests are used to determine if the data sets are normally distributed. V and V’ are indices based on the computed Shapiro-Wilk and Shapiro-Francia test statistics. The larger the V and V’ statistic, the less normally distributed the data set. Z-values are the normalized value of the corresponding test statistics to allow for testing of departures from normality. Values with ** and * indicate that normality is rejected at $P \le 0.01$ and $P \le 0.05$, respectively.

Table 5. Results of the equality of variances tests for loss ratios of Texas cotton producers classifying insured units as actual yields (ACT), added land using SA T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP)

Comparisons	Bartlett's test[z]	Levene test[z]
	F-statistic	Median-based Levene statistic
A. ALV vs. ACT	1.19	0.25
B. ALS vs. ACT	0.99	0.22
C. NP vs. ACT	1.97**	2.07

[z] The Bartlett test and the median-based Levene statistic test for the equality of variances and are more sensitive to non-symmetric distributions. The median-based Levene statistic allows for testing equality of variances even under asymmetric distributions. Values with ** indicate that equality of variance is rejected at $P \leq 0.01$.

Table 6. Wilcoxon-Mann-Whitney tests and Hodges-Lehmann shift parameter estimates for loss ratios of Texas cotton producers classifying insured units as actual yields (ACT), added land using SA T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP)

Wilcoxon-Mann-Whitney test statistics		
Categories compared	z-statistic[z]	Pearson chi-square[z]
ALV vs. ACT	2.56**	7.11**
ALS vs. ACT	2.54*	5.76*
NP vs. ACT	5.89**	29.57**
Hodges-Lehmann shift parameter estimates[y]		
Categories compared	Point estimate of shift	95% Confidence interval
ALV vs. ACT	0.38	[0.09, 0.68]
ALS vs. ACT	1.32	[0.27, 1.93]
NP vs. ACT	1.05	[0.74, 1.38]

[z] The z-statistic is the normalized value of the Wilcoxon-Mann-Whitney test statistic that allows for testing whether the median of the two groups are statistically drawn from the same distribution. Values with ** and * indicate the equality of medians or distributions are rejected at $P \leq 0.01$ and $P \leq 0.05$, respectively.

[y] The shift parameter is the estimated difference between Category 1 and Category 2 values (e.g. in the case of ALV vs. ACT, the shift parameter = ALV – ACT).

Table 7. Two-sample Kolmogorov-Smirnov Test using the loss ratio data of Texas cotton producers classifying insured units as actual yields (ACT), added land using SA T-yields (ALS), added land using variable T-yields (ALV), and new producer using variable T-yields (NP)

Categories compared/null hypothesis alternative hypotheses	Kolmogorov-Smirnov *D* statistic[z]
ALV vs. ACT/(H_0: ALV = ACT)	
H_a: ALV > ACT	-0.264**
H_a: ALV ≠ ACT	0.264*
ALS vs. ACT/(H_0: ALS = ACT)	
H_a: ALS > ACT	-0.529**
H_a: ALS ≠ ACT	0.529*
NP vs. ACT/(H_0: NP = ACT)	
H_a: NP > ACT	-0.477**
H_a: NP ≠ ACT	0.477**

[z] Kolmogorov-Smirnov is a non-parametric test for the equality of distributions. The *D* statistic is the statistic used to evaluate the difference between the two distributions. Values with ** and * indicate the difference between distributions is statistically significant at $P \leq 0.01$ and $P \leq 0.05$, respectively (i.e. the null hypothesis (H_0) is rejected).

provided by the RMA to the authors is, by necessity, aggregated at the county level. Hence, we are not able to ascertain the individual specific variables listed above that may have caused legitimate statistical differences, which precludes the use of a more comprehensive statistical approach (such as regression analysis). Given the limitations in the data we used, the results in this paper can be viewed as an initial “descriptive” step towards understanding the loss experience of added land and new producers, vis-à-vis producers who use actual production history. The next step then is a more comprehensive statistical analysis of the loss experience of individual added land and new producers using detailed unit-level data (if made available).

Even with the caveats above, we believe that the systematically higher loss ratios alone (regardless of the cause) still highlight the need for the RMA to re-assess the added land and new producer provisions. More research needs to be done in the area for the RMA to further discern the causes of the systematically higher loss ratios and address these issues. These results should also raise concerns to Texas cotton producers, in general, since they are the ones that are likely to be adversely affected by this systematic phenomena that can potentially lead to higher premiums in the future.

CONCLUSIONS AND POLICY IMPLICATIONS

This study analyzes the vulnerability of the added land and new producer provisions in crop insurance and evaluates the incentives that potentially make it vulnerable to abuse. The producer’s potential benefits of abusing these provisions may be higher than the potential costs because of the informational advantage held by the producer with regards to the inherent productivity of their land. This informational asymmetry provides the mechanism whereby the added land and new producer provisions may be vulnerable to abuse. A descriptive analysis of the loss ratios of Texas cotton producers utilizing the added land and new producer provisions indicate significantly higher loss ratios for these producers, relative to producers using actual production history. This result further supports the notion that the added land and new producer provisions may indeed be vulnerable to abuse. But note that the analysis above is not definitive proof of its existence. Further research using a more disaggregated data set is still needed.

Nevertheless, the insights above indicate a need to continually re-examine the added land and new producer provisions and explore policy options that may help mitigate occurrences of abuse. Since the vulnerability of the added land and new producer provisions stems from the asymmetric information held by producers, policymakers can reduce the vulnerability of these provisions by minimizing or eliminating this informational advantage. At the extreme, insurers or the RMA can eliminate the informational asymmetry by reviewing all producers who want to add land and or claim new producer status. On-farm visits and review can also be undertaken for all these producers wanting to utilize the added land and new producer provisions. This policy option may not be cost effective because of the immense amount of resources needed to implement it.

Another policy option that may mitigate the incentives for abusing the added land and new producer provisions is to manipulate or improve the T-yields used for determining the approved APH yields in these cases. For producers to successfully benefit from abusing the added land and new producer provisions, the T-yields used to determine the yield guarantees should be significantly higher than what could be the actual harvested yield based on the productivity of the land. If the T-yields used are approximately the same as the actual yields, then abuse of the added land and new producer provisions can be mitigated. Thus, one option would be to regularly review and revise the variable T-yields used for yield determinations. Variable T-yields can be further refined by investigating or collecting farm level data to more accurately determine the “correct” variable T-yield, but this may not be a very cost effective option.

Another way to manipulate T-yields to reduce the incentives for abusing the added land and new producer provision is to reduce the percentage of the allowed SA T-yield or variable T-yield that can be used to determine the yield guarantee. Instead of using 100% of the SA T-yield or the variable T-yield, policy makers can change this proportion to somewhere between 65 to 85%. Reducing this proportion would reduce the magnitude of the potential benefits from abuse and may reduce the incentives for abusing the provisions.

Adjusting the premium rates or premium subsidies for the added land and new producer provisions is another means for mitigating the incentives for abuse. If the premium rates are increased or the premium subsidies are reduced, the costs of abusing the added land and new producer provisions increases. This then reduces the incentives to abuse the provisions. Increasing the premium rates for added land and new producer provisions is akin to the experience rating system in automobile insurance. A producer that is adding land or claiming new producer status presumably has no experience planting the crop in the added/new land. Therefore, these producers should be charged a significantly higher premium because of their inexperience. Premiums can then be reduced when the producer has built-up his four-year production history such that actual yields are used in determining the yield guarantee. As in the automobile insurance, new drivers are charged a higher premium than more experienced drivers.

There is one big drawback, however, with reducing applicable T-yields and increasing premium rates as policy options to reduce the vulnerability of the added land and new producer provisions. Using these options would likely reduce participation in the crop insurance program. This runs counter to the thrust of USDA to increase participation in the program. Hence, more research is needed to further understand the practical applicability of these suggested policy options.

Based on our analysis of the incentives for abuse, another policy option to consider is further strengthening of compliance efforts to detect potential abuse of these provisions. If detection probabilities are increased then expected net utility gains from abuse would be decreased and, consequently, the probability of abuse would be lessened. RMA compliance may be able to strengthen its detection capabilities by using computer-assisted fraud detection techniques called data mining. Although these techniques are already being utilized by the RMA, further research is still needed in this area to be able to more effectively uncover particular abuses tied to the added land and new producer provisions. These computer-assisted techniques must always be reinforced by more in-depth investigations if abuse is indeed to be proven.

Another policy option that can help mitigate abuse is to simply provide more information to farm communities about the current compliance efforts and how farming communities can help in these efforts. The most recent RMA compliance report to Congress already indicates that current compliance efforts (e.g. Fraud Hotline complaints and tips) have been able to somewhat deter abuses of the new producer provisions (USDA-RMA, 2002c). These types of compliance efforts would be strengthened if farming communities more readily report blatant cases of abuse by other producers. More of these abuses may potentially be reported if producers know that these abuses will adversely affect their future premiums and consequently the competitive position of their industry in the world market. The RMA must then make clear to communities the adverse effects of these abuses, which may then encourage farmers to report abuses of the added land and new producer provisions. For example, in their efforts to mitigate illegal seed saving of Roundup Ready soybeans [*Glycine max* (L.) Merr.], seed companies aggressively advertise the adverse effects of this practice to build communal outrage and encourage reporting of this activity. A similar tactic can be employed by RMA where the informational campaigns are targeted to areas with high loss ratios.

Informing farming communities of the adverse effects of abusing the added land and new producer provisions also relates to the moral costs of abuse that we elucidated in the introduction. If farmers are aware of the adverse effects of abusing the insurance program, then the community is less accepting of this type of behavior. Thus, moral costs to individuals contemplating abuse would be higher and the probability of being reported to RMA through the fraud hotlines may also be higher. For the case of Texas cotton, a less accepting attitude to abuse by Texas cotton producers may be the most important contribution they could make in the quest to mitigate abuse of the added land and new producer provisions in crop insurance. If Texas cotton farming communities are less tolerant to abuse, then the social stigma to potential abusers of these provisions may be higher. This leads to a potential decrease in the net utility gains from abuse and would potentially discourage the abuse of the added land and new producer provisions in crop insurance. With the reduction in abuse, the federal crop insurance program can remain a viable risk management tool for Texas cotton producers and will continue to assist in maintaining the competitiveness of the industry.

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DISCLAIMER

The views expressed in this article are those of the authors and do not necessarily reflect those of the Risk Management Agency. The authors are responsible for all errors.

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