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Factor that Affect Arkansas Farm Operators' and Landowners' Decision to Participate in Agritourism

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Selected paper prepared for presentation at the Southern Agricultural Economics Association Annual Meetings, Orlando, FL, February 6-9, 2010

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Summary

This study utilizes survey data analyzed at the regional level to obtain additional insights which may be left unnoticed if the analysis only considers data at the state level. The current analysis reveals that farm operators' and/or landowners' decision to participate in the agritourism industry in Arkansas is affected by state government infrastructure. But these infrastructures are varied among regions. The infrastructures are state government support in training the farm operators; in promotion and marketing as well as certainty and transparency in laws and regulations. State government's sponsored trainings in agritourism along with marketing and promotion are viewed as the most important factors in all studied regions that affect operators' decision to participate in the program. This finding suggests that state agricultural extension agencies can play an important role in the future to ensure the success of the newly developed agritourism industry in Arkansas.

Introduction:

Agricultural Economist and other Social Scientist have worked for decades on improving and creating jobs in rural areas. For many rural areas employment opportunities seem to be in a continual decline, thus the task to reduce the downward trend is critically important. Statistical data show that the younger rural generation is less likely to continue working in agriculturally related activities. There are many factors that influence people's decision not to continue working in agriculture, chief among these being the higher wages available in urban areas in many other sectors of the economy. Another factor is the lack of amenities (cultural, recreational, educational, etc.) in most rural locations, though the natural beauty and quieter life style offered by many rural places has a strong appeal to many individuals.

Farm incomes are also adversely impacted by the amount of competition from international agricultural production and trade. This is driving farms to enhance their efficiency to compete with international production as well as with domestic producers. Most farms are achieving their efficiency through increased mechanization and size of operations. The increased mechanization of farm operations means there is less need for farm labor and therefore we will continue to see increases in unemployment in rural communities if alternative opportunities are not developed.

The decline in farm employment opportunities have coincided with a decrease in the availability of manufacturing and other non-agricultural jobs in most rural locations. This has caused a continual decline in the quality of rural community life, it is becoming harder to retain families and labor in agriculture and in rural America in general. Both state and federal agencies have worked for many years to reverse this unfavorable trend.

Recent research indicates policy makers and rural developers have begun to better appreciate the significant desirable impacts of agritourism on the rural economy/community (Barbiere, 2008; Brown and Reeder, 2008). The support for making agritourism as an integral approach to improve rural residents' quality of life is even stronger in states where farming contributes a significant part of the state Gross Domestic Product (Che, Veeck, and Veeck, 2005). Recent research showed that Arkansas agriculture contributed approximately 12 percent of the state's GDP (Kemper, Popp, and Miller, 2009). Indicating agriculture plays a much more important role in Arkansas's economy than in any of its surrounding states and the nation as a whole.

Agritourism in Arkansas has been defined as any activity, enterprise or business which is design to increase farm and community income through combining the essential elements of the tourism and agricultural industries (Winthrop Rockefeller Institute (WRI), 2009). Improving and creating jobs in rural areas is one of the most important tasks rural local governments have been addressing for many years. However, this objective while important has faced many challenges. One of the most challenging tasks found in the past is how to utilize and engage rural residents to actively participate in programs that will alter their traditional way of conducting life/business. The majority of rural residents may not want to change the way they have worked for many years and generations. Hopefully, they will view agritourism as an extension of their current lifestyle and thus be less resistant to implementing this strategy.

The Arkansas Department of Parks and Tourism reported that there were more than 20 million travelers to Arkansas and spent more than $4 billion annually (WRI, 2009). In addition, agriculture sector plays important role in the state economy and accounted for twelve percent of the Gross State Product (Kemper, Popp, and Miller, 2009). Forming and promoting a new

industry i.e., agritourism by combining these two sectors not only will increase state revenue, but also will benefit and have direct impacts on farm income especially in the rural areas (Barbieri, 2008; Che, Veeck, and Veeck, 2005). Furthermore, more jobs are created as a direct result of forming the new industry especially in the farm sector.

The agriculture component of agritourism may not be a problem for many farmers. However, the tourism component may be something new to many. This part, could potentially affect their participation in the agritourism industry. The tourism element is meant to increase farmers' income, but it may potentially increase the operators' hesitation to participate. The resource guide book to farmers and landowners in Arkansas has stated certain factors need to be provided by the operators before their operation can be classified as agritourism, ie provide the visitor an interactive activity. This means there are certain elements that need to be added or eliminated from the current practices. For some operators they may need to learn these new regulations or elements and support the program. But for others the new rules will be seen as additional burdens or constraints. Knowing their decision factors to participate in the program is important which will help to secure the success of agritourism in Arkansas. It is the objectives of this study are to determine factors that affect Arkansas farmers and/or farm operators to participate in the agritourism industry which is being promoted in the state. Farm operators and/or landowners were surveyed throughout the state. A data base will be built based on respondent's answers and exploratory factor analyses will be applied to assess, study and to identify the factors. Indentifying such factors are important to increase farmers and landowners participation in the industry which has direct impacts to improve rural income and jobs creation in the areas.

Data

Data were gathered through surveys throughout the state of farm operators and landowners. A set of prepared questions will be asked during the phone survey. This survey will be conducted by the Survey Center at the University of Arkansas with trained personnel and interviewers. In addition to the prepared questionnaires, interviewers will also asked open ended questions which help to capture the traits that may not be included in the questionnaires. Once the data are keyed in and data base are built, the statistical analyses will be conducted using Factor Analysis. There were 108 farms or/and landowners were surveyed and about 95 % who were surveyed have agritourism activities in their operation. Table 1 showed agritourism survey responses per region. Ozark region has the highest rate of responses compared to the other two regions followed by Delta and Ouchita region. Many annual festivals are found in the Ozark region such as apples and grapes in Lincoln and Tontitown. These festivals have been around for a number of years. Therefore, operators' or/and landowners' awareness of such a program is much higher than those of in other regions. A further breakdown of the response at the county level is presented in Table 2.

Table 1 - Agritourism Survey Respons per Region

Regions	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Delta	31	28.7	31	28.7
Ouachita	24	22.2	55	50.93
Ozark	53	49.1	108	100

Table 2 shows that not all responses generate from all counties in Arkansas. Operators in some counties may have rejected to participate in the surveys or they may not have agritourism activities in their farms. Therefore, none of the information can be generated from them. The highest number of participation in any given county is seven responses. All three regions have this number. For example, Lonoke County in the Delta region has seven respondents. Likewise,

Table 2 - Survey Responses by County

Counnty	Regions			Total
	Delta	Ouachita	Ozark	
Arkansas	6	0	0	6
%	5.56	0	0	5.56
Baxter	0	0	1	1
%	0	0	0.93	0.93
Benton	0	0	3	3
%	0	0	2.78	2.78
Boone	0	0	2	2
%	0	0	1.85	1.85
Bradley	0	1	0	1
%	0	0.93	0	0.93
Calhoun	0	3	0	3
%	0	2.78	0	2.78
Carroll	0	0	5	5
%	0	0	4.63	4.63
Clay	2	0	0	2
%	1.85	0	0	1.85
Cleburne	0	0	1	1
%	0	0	0.93	0.93
Columbia	0	2	0	2
%	0	1.85	0	1.85
Conway	0	0	5	5
%	0	0	4.63	4.63
Crawford	0	0	2	2
%	0	0	1.85	1.85
Cross	5	0	0	5
%	4.63	0	0	4.63
Drew	0	1	0	1
%	0	0.93	0	0.93
Faulkner	0	0	1	1
%	0	0	0.93	0.93
Franklin	0	0	5	5
%	0	0	4.63	4.63
Fulton	0	0	1	1
%	0	0	0.93	0.93
Garland	0	1	0	1
	0	0.93	0	0.93
Grant	0	1	0	1
%	0	0.93	0	0.93
Greene	1	0	0	1
%	0.93	0	0	0.93
Hempstead	0	1	0	1
%	0	0.93	0	0.93
Hot Spring	0	2	0	2
%	0	1.85	0	1.85
Howard	0	1	0	1
%	0	0.93	0	0.93
Continued				

Table 2 - Continued

Counnty	Regions			Total
	Delta	Ouachita	Ozark	
Independence	1	0	0	1
%	0.93	0	0	0.93
Jackson	1	0	0	1
%	0.93	0	0	0.93
Jefferson	2	0	0	2
%	1.85	0	0	1.85
Johnson	0	0	1	1
%	0	0	0.93	0.93
Lafayette	0	1	0	1
%	0	0.93	0	0.93
Lawrence	1	0	0	1
%	0.93	0	0	0.93
Lincoln	1	0	0	1
%	0.93	0	0	0.93
Logan	0	0	2	2
%	0	0	1.85	1.85
Lonoke	7	0	0	7
%	6.48	0	0	6.48
Madison	0	0	1	1
%	0	0	0.93	0.93
Mississippi	1	0	0	1
%	0.93	0	0	0.93
Monroe	1	0	0	1
%	0.93	0	0	0.93
Nevada	0	1	0	1
%	0	0.93	0	0.93
Newton	0	0	5	5
%	0	0	4.63	4.63
Perry	0	0	3	3
%	0	0	2.78	2.78
Polk	0	1	0	1
%	0	0.93	0	0.93
Pope	0	0	5	5
%	0	0	4.63	4.63
Pulaski	0	7	0	7
%	0	6.48	0	6.48
Randolph	1	0	0	1
%	0.93	0	0	0.93
Scott	0	1	0	1
%	0	0.93	0	0.93
Van Buren	0	0	1	1
%	0	0	0.93	0.93
Washington	0	0	7	7
%	0	0	6.48	6.48
White	1	0	0	1
%	0.93	0	0	0.93
Yell	0	0	2	2
%	0	0	1.85	1.85
Total	31	24	53	108
%	28.7	22.22	49.07	100

one will find seven respondents in Pulasky and Washington County which grouped into Ouachita and Ozark County, respectively. The second higher response is generated from Arkansas County with six responses followed by Conway, Franklin and Pope County which is all grouped in the Ozark region.

Among those respondents who supplied the answers, there is clear evidence that shows activities generated from the Agritourism contribute about twenty to twenty five percent of all farm product total sales (Table 3). For example, at the total farm sales of $10,000.00 - $49,999.00 there are six respondents who have agritourism sales between of $10,000–$15,000. The same information is also shown in different sales brackets. A little less than a half of the operators (47 percent) make more than $2,500.00 from agribusiness activities. This information shows that Agritourism is important sources of additional income for farm operators and/or landowners, especially for a smaller farm.

Table 4 shows the majority of the respondents' reason to participate in Agritourism in their farm is to supplement income. This is one of the clear evident that shows the Agritourism program has answered the needs of farm operators and/or landowners in Arkansas. It becomes more important for the state agencies to ensure and to promote Agritourism activities throughout the state. Eliminating any constraints, regulations or rules that can discourage farmers to participate in the program need to be minimized. In addition, the concerned agencies needs to work closely with the clientele to make sure that the program will be available to every farmers who are interested in pursuing it in their farm.

The survey also reveals the expenditure that individual visitor spent while visiting the farms as shown in Table 5. The majority of the visitors about forty four percent of them spent

Table 3 - 2008 Sales Comparisons: All Farming and Agritourism Activities

		Agribusiness Sales									
Total Farm Sales	Explanations	< $2,500 or less	$2,500 - $4,900	$5,000 - $9,999	$10,000 - $15,000	$15,000 - $50,000	$50,000 - $74,999	> $74,999 - $99,999	>$99,999 - $249,999	> $249,000	Total
$9,999 or Less	Frequency	42	4	7	0	0	0	0	0	0	53
	Percent	42.86	4.08	7.14	0	0	0	0	0	0	54.08
	Row Pct	79.25	7.55	13.21	0	0	0	0	0	0	
	Col Pct	80.77	100	87.5	0	0	0	0	0	0	
$10,000 to $49,999	Frequency	6	0	0	6	8	0	0	0	0	20
	Percent	6.122	0	0	6.122	8.16	0	0	0	0	20.41
	Row Pct	30.00	0	0	30	40	0	0	0	0	
	Col Pct	11.54	0	0	85.71	80	0	0	0	0	
$50,000 to $99,999	Frequency	0	0	1	0	2	3	0	0	0	6
	Percent	0	0	1.02	0	2.04	3.06	0	0	0	6.12
	Row Pct	0	0	16.67	0	33.33	50	0	0	0	
	Col Pct	0	0	12.5	0	20	100	0	0	0	
$100,000 to $249,999	Frequency	2	0	0	0	0	0	2	6	0	10
	Percent	2.04	0	0	0	0	0	2.04	6.12	0	10.20
	Row Pct	20.00	0	0	0	0	0	20	60	0	
	Col Pct	3.85	0	0	0	0	0	100	66.67	0	
$250,000 or more	Frequency	2	0	0	1	0	0	0	3	3	9
	Percent	2.04	0	0	1.02	0	0	0	3.06	3.06	9.18
	Row Pct	22.22	0	0	11.11	0	0	0	33.33	33.33	
	Col Pct	3.85	0	0	14.29	0	0	0	33.33	100	
Total		52	4	8	7	10	3	2	9	3	98

five dollars or less while attending agritourism activities. About twenty percent of the visitors spent between $15.00 - $35.00 or more than $50.00. Visitors will spend more if the operators

also offer on-farm lodgings in addition to agritourism itself. It is an interesting finding that will open the opportunity for the operators to increase sales from agritourism by offering on-farm lodging. Apparently the availability of lodging is an important facility to support agritourism, particularly for hunting related agritourism activities.

It is also worth noted that the highest number of visitors are from individuals that account for 50 percent followed by family visitors as shown in Table 6. This is also important information for the farm operators or/and landowner to penetrate their clientele in effort to increase the attendees. This will also help the state agency to decide on promotion media and type of advertising messages that need to be passed on to different groups of visitors in order to maximize the promotion budget or the advertising expenditures

Table 4 - Reasons to Participate in Agritourism

Reasons	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Income supplement/Increase profitability	35	34.31	35	34.31
Teach visitors about farm heritage	12	11.76	47	46.07
Enjoy working with people	28	27.45	75	73.52
Eco-friendly nature of the activities	13	12.74	88	86.26
Others	12	11.76	100	98.04
Do not know	2	1.96	102	100

Methods:

Econometrics approaches may not be an appropriate approach to answer the research problem for three reasons. First, there is no independent variable that can appropriately be estimated.

Table 5 - Average Visitors' Expenditure per Visit				
Expenditures	Frequency	Percent	Cumulative Frequency	Cumulative Percent
$5.00 or Less	36	43.9	61	74.39
$5.00 to $10.00	2	2.44	63	76.83
$10.00 to $15.00	2	2.44	2	2.44
$15.00 to $35.00	18	21.95	20	24.39
$35.00 to $50.00	5	6.1	25	30.49
$50.00 or more	19	23.17	82	100

Second, non-metric nature of the collected data generated through surveys. Third, the independent variables or operators' or/and landowners' preference are all unobserved. Given these reasons, factor analysis is a better approach to understand the traits that affect operators' participation in the program. Knowing any decision factors that will increase farm operators' and/or landowners' participation in agritourism industry in the state of Arkansas is important. Factor analysis approach can be applied to determine traits that either encourage or discourage farmers' participation. Knowing both of these factors is important such that a program or appropriate approach can be applied to meet the majority of participants' expectation.

Table 6 - Type of Visitors				
Visitors	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Families	23	22.55	23	22.55
School Groups	6	5.88	29	28.43
Business Groups	2	1.96	31	30.39
Tour Groups	7	6.86	38	37.25
Individuals	51	50	89	87.25
Group of Friends	9	8.82	98	96.08
Do not know	4	3.92	102	100

Factor analysis was popularized by Karl Pearson, Charles Spearman and others in the areas which was known later as psychometrics. At the beginning, this approach faces many computational challenges, particularly in finding the eigenvalues of large matrices which are

needed to find the solution of the common factors. As more high speed computers and statistical software available this method gains popularity, not only in the psychometrics field but also in marketing research, management and education or any fields of study that deal with measurements and scale developments. The main purpose that researchers employ this approach on their study is to reduce the number of variables which are generated through questioners to a smaller group of common variables which measure the same traits. These traits are known as constructs or common factors.

This approach utilizes the *covariance* relationships among many variables in terms of a few underlying, but unobservable, random quantities called *factors* or *construct*. If the relationships among variables are weak or independent or if the sample covariance is small or close to zero, this approach will not be useful. Stronger dependency among the observed random variables will ensure the existence of solution of factor analysis. This sounds a bit difference than the desired properties of random variables in the classical statistical theory i.e. zero covariance.

Supposed the observable random vector **X,** with p components has population mean and covariance equal to $\boldsymbol{\mu}$ and $\sum$**.** The factor model postulates that **X** is linearly dependent upon a few unobservable random variables $F_1, F_2, \ldots, F_m$, which are called common *factors*. It also can be stated the other way that *factors* are the expression of the p *deviations* of $(X_1 - \mu_1, X_2 - \mu_2, \ldots\ldots, X_p - \mu_p)$ in term of (p+m) random variables. The two term p and m refer to the number of observable random variable x and m is the number of unobservable common factors.

In addition to the common factor, p additional sources of variations $\varepsilon_1, \varepsilon_2, \ldots\ldots, \varepsilon_p$, are also found as sources of variations. These additional sources of variation or errors or specific

factors are unobservable as well. Given, the relationship among elements in **X** and **F** one can express their relationship as shown in equation (1) below which is written in a matrix form as:

(1). $\mathbf{X - \mu = L\ F + \varepsilon}$

X and **μ** have (p x 1) dimension. This two terms measure the deviation of the random variable **X** from its mean (**μ**) which can be explained by factor loadings **L**, constructs or common factors (**F**) and the specific factor **ε**. **L** and **F** has (p x m) and (m x 1) dimension.

The factor loadings (**L)** are also known as factor coefficients. Since the model tries to predict more than one factor (F), then the relationship as expressed in equation (1) becomes a problem of a multivariate linear model. The loadings are equivalent to the sum of the weight for a particular characteristic. This characteristic explains an individual's answer on a particular question asked in the questioners. Different individual will give different response or answer to a particular question depending on the unique situation or/and past experience that he or she has had. For example, an individual I's response in situation 1 (x_{i1}) on characteristics A can be assigned a particular weight given the situation (1) to characteristic A as ω_{1A}. The sum of all weight for characteristic A given by total respondents is called a factor loading or a factor coefficient for that particular characteristic (A).

The common factor **F** and the specific factor **ε** are unobservable and they are independent. If these two terms are dependent, then all information in **ε** would have been observed or captured by **F or** vice versa**.** The independency among elements in **F** and **ε** implies the off diagonal elements in their covariance matrix are zero. On the other hand, the covariance of p elements in **X** should be dependent among one another as shown by Cov (**X**). Otherwise, no common traits or constructs can be found. Relationship among these elements will ensure the

existence of common factors. However, a correlation of 0.90 between two variables is inappropriate because it implies that the measure the same thing.

It can be shown that Cov (**X**) = **LL'** + **Ψ,** where **Ψ** is the Cov (**ε**) and has a form as a diagonal matrix. One can write the covariance of **X** equals to the expected value (E) of the multiplication of the deviation from its means with its inverse relationship as expressed in equation (2).

(2). $\sum = E\{(X - \boldsymbol{\mu})(X - \boldsymbol{\mu})'\}$, where E is the expected value.

Using the relationship in equation (1), one can rewrite equation (2) as:

$= E\{(\mathbf{LF} + \boldsymbol{\varepsilon})(\mathbf{LF} + \boldsymbol{\varepsilon})'\}$

$= E\{(\mathbf{LF} + \boldsymbol{\varepsilon})((\mathbf{LF})' + \mathbf{LF} + \boldsymbol{\varepsilon}'\}$

$= E\{\mathbf{LF}(\mathbf{LF})' + \boldsymbol{\varepsilon}(\mathbf{LF})' + \mathbf{LF}\,\boldsymbol{\varepsilon}' + \boldsymbol{\varepsilon}\,\boldsymbol{\varepsilon}'\}$

$= \mathbf{L}\,E(\mathbf{FF'})\,\mathbf{L'} + E(\boldsymbol{\varepsilon}\,\mathbf{F}')\,\mathbf{L}' + \mathbf{L}\,E(\mathbf{F}\,\boldsymbol{\varepsilon}') + E(\boldsymbol{\varepsilon}\,\boldsymbol{\varepsilon}')$; therefore the covariance structure of **X** can be written as

(3). $\sum = \mathbf{LL'} + \boldsymbol{\Psi}$

Equation (3) shows the covariance structure of observable observation **X** depends on the multiplication of common factor loadings with its inverse i.e. Cov (**X**, **F**) plus the covariance of specific factors, i.e., Cov (**ε**) where it's off diagonal elements are zero . Stated in other words, the covariance of the observed variables in **X,** which is ∑ can be partitioned into a common portion which is shown by (**LL'**) or the covariance of the factor loadings and a unique portion which cannot be explained by set of common factors (**Ψ**) or the covariance of the unique factors.

Note that the covariance structure $\sum$ expressed in equation (3) only true if the number of common factors (**F**) which is m is less than the number of observed variables (**X**) which is p. This means the model is able to reduce the number of "original" or observed variables as asked in the questionnaires into a smaller set of constructs or common factors. This is basically the whole purpose of employing factor analysis in that to reduce a group of variables which measures the same trait into a single common factor. If m = p or if m > p then i is not useful to use this approach because of its failure to achieve the main objective. If $\sum$ exists then the characteristic equation can be constructed to find the root of the equation, i.e., the eigenvalues which will be useful to determine the number of factors to be retained later in the analysis. Past factor analysis models have used eigenvalues > 1 rule as a guide to retain how many final factors need to be retained in the analyses.

There are several steps that need to be done when conducting factor analysis. First, one needs to decide what type of factor analysis will be implied. This study applies common or exploratory factor analysis to approach the problem. In this approach, the variance of a single variable can be decomposed into the squared of standard deviation which is common and shared by other variables included in the model. Common factor analysis will also help identifying the inter-correlations among the observed variables by extracting a small number of traits which enable to identify latent dimensions that explain the reason why variables are correlated. This method is also chosen because it is an appropriate way to explore the unknown traits that are important for farmers in making their decision either to participate in the Agritourism program or not.

The second step is to determine the number of factors that need to be retained in the model. There are several ways to determine the number of factors such as Kaiser-Gutmann rule,

percentage of variance, scree plot test, and the size of the residuals. This study applies scree plot test which is available in SAS, PROC factor analysis. The scree plot illustrates the relationship between the rates of change of different factors' eigenvalues or characteristics root and the factors. Since the eigenvalues are calculated from covariance matrix $\sum$, then different values will be generated as the number of retained common factors is changed. Therefore, the scree plot will have a downward sloping slope. This also can be interpreted as a decision rule whether one needs to add one more factor into the analysis. If the eigenvalue drops dramatically when an additional factor is added, it suggests that the additional or marginal information is not significant. As suggested by Hakstian, Rogers and Cattell (1982), the basic rationale of the scree plot in the factor model analysis is to retain factors that account for larger variance and leave out those with a smaller squared standard deviation.

The estimation step for factor loadings can be done either using principal component (PC) or maximum likelihood method (ML). The PC approach is less superior to solve the factor analysis compared to the ML. PC approach employs as many common factors as they are variables and does not allow for any possible variation in the specific factor as denoted as $\boldsymbol{\varepsilon}$ in equation (1). Therefore, it is less efficient way of finding the underlying constructs. On the other hand, ML not only has advantages compared to PC, but it also will allow one to conduct hypothesis testing iff the observable variable in **X** has multivariate normal characteristics such that the second moment of equation (3) contains all information need in the factor model analyses. Moreover, If the factor model is linear as shown in equation (1), then it is possible to find the factor loadings (**L**) that represents the correlations between **X** and **F** invariant whether $\sum$ represents the covariance or the correlation matrix (Basilevky, 1994). It is also true that **X** has a linear relationship with **L**, but may not necessary with **F**. These properties are not shared in the

PC approach. As stated above, the **F** is unobservable. Therefore, the initial step to find the solution to the factor model will be accomplished by estimating equation (3) and set **Ψ=I.** This enables one to estimate **L** (common factor loadings) and **Ψ** (the covariance of specific factor) jointly (usually) by iterative method. As pointed out earlier, this study will use the exploratory factor analysis. Therefore, the most appropriate estimator to achieve the objective is to apply the Unrestricted ML Factor Model as expressed in equation (3) and not the restricted model which is more appropriate to be applied for confirmatory factor model (Lawley and Maxwell, 1971).

Results:

The results of this study will increase one's understanding of knowing the important but yet unobservable factors that affect Arkansas farmers' and landowners' decision to participate in the Agritourism industry. The questions on the questioners try to answer both internal (controllable) and external factors (uncontrollable). The internal components deal with factors that farm operators and/or landowners to some degree have control on them. For example, whether participation in the program as an effort to increase farm income. In this case, operators have the choice when making the decision. On the other hand, the external factor will leave operators with little choices if no choice at all. For example, operators do not have any control on conducting marketing or record keeping trainings which run by the state government. Nor they have any control on state regulation on zoning, permit, tax or liability insurance. This study will focus more on factors of which operators have no or little control. The exploratory factor analysis will identify whether both internal and external factors will have the impacts on farm operators and/or landowners' decision to participate in the program. However, this study does not try to confirm which of these two groups will have the most important effects. Therefore, exploratory factor approach is appropriate to answer the research questions.

External factors basically are infrastructures needed to support agritourism activities. These factors help to increase and therefore to ensure the success of the program at the farm level. For example, state government sponsored promotion on agritourism through advertising or events-sponsored program will increase the viability of the program to a broader audiences. Operators just do not have enough resources to accomplish such an objective. Another example would be record keeping knowledge to keep track on the number of visitors and the amount of cash receipts generated from agritourism at any given week or month. All these factors are importance for them. The state government can sponsor these infrastructures which farm operators do not have any control upon, but will determine the success of Agritourism program at the farm level.

Three subscales can be developed from the external uncontrollable factor under a broader label of infrastructure. The development of these subscales is important not only to make sure that appropriate questions are asked in the questioners, but also to achieve or generate reasonable internal consistency reliability as measured by Cronbach's coefficient α. Lower alpha coefficient indicates that different questions have been asked to measure what the questions are intend to measure (Agina, Djunaidi). Hair et.al suggested that the acceptable minimum alpha coefficient is 0.60 in the exploratory factor analysis. These three subscales along with their responding α coefficient are presented in Table 7. The alpha coefficients for each region are above the cutting point except for subscale laws and regulations in Uoachita region. A misleading conclusion could have been made on Uoachita, had the all region data were used in the analysis. Breaking down the analysis into the regional level adds value in the analyses. Both the promotion &

advertising and agritourism trainings subscale are significant in all the three regions.

Table 7 - Infrastructure Subscale and Cronbach Coefficient

Subscale	Alpha			
	Regions			
	Ozark	Delta	Ouachita	All Region
State Government Support on Agritourism Promotion and Advertising	0.74	0.79	0.72	0.74
State Government Laws and Regulations	0.74	0.73	0.35	0.66
State Government Support on Agritourism Trainings	0.85	0.69	0.64	0.78

The alpha coefficients are consistently higher in Ozark regional compared to any of the other two regions. These results could have been affected by the number of observations collected in the surveys. Table 1 showed that the Ozark's sample size about double compared to that of the other two regions. Subscale promotion & advertising is well above seventy percent in all regions with its regional average equal to 0.75. This subscale has the highest average among the other two subscales where subscale laws and regulations is the lowest. This result may suggest that state government support on marketing & promotion are seen as the important factor by the operators, especially in the early stage of its development. There are seven questions that make up promotion & advertising subscale while laws and regulations subscale has five questions. Seven questions on the promotion and marketing subscale, respectively. Five questions were asked in the laws and regulations subscale. Among the three subscales, this subscale has the lowest average α coefficient of 0.61, but still greater that the critical value as suggested in most literature. However, given the coefficient is so low in the Ouachita region, this subscale is not useful to make any inference on farm operators' or/and landowners' decision to participate in agritourism which is being promoted in the state. All these questions have measured the construct that they are intended to measure as shown by its respective Cronbach coefficient except for laws and regulations in Ouachita region. Three questions were asked in the trainings subscale and this subscale has the second highest average α coefficient of 0.73.

Table 8 shows the covariance matrix of the original variables (**X**). The off diagonal elements show of no sign that two questions or variables are perfectly correlated even though they are all intended to measure the same construct. For example, question 5 and question 6 measures the common factor on state government's law and regulations has a correlation of 0.26. Likewise, question 15 and 26 measure marketing and promotion construct and their correlation is 0.28. This finding suggests that no repeated questions were asked in the questionnaires. The diagonal element of the matrix shows the correlation of the variable with itself. Therefore, they all equals to 1. Questions labeled 5, 6, 7, 10 and 12 (written number at the end of each question) measure state government's regulations and laws common factor. Moreover, questions labeled 15, 18, 19, 20 22, 25 and 26 are intended to measure marketing and promotion while questions 21, 23 and 24 measure training traits.

Table 7 shows the variance and covariance (correlation) matrix of the unique factor or the (Cov ($\boldsymbol{\varepsilon}$) or $\boldsymbol{\Psi}$ as shown in equation (3). As discussed earlier in the model section, the off diagonal elements of matrix $\boldsymbol{\Psi}$ measure the amount of unexplained or unique variance in each variable. Therefore, if the off diagonal are close to zero that shows the common factor model have explained the information on the original variable appropriately. This finding suggests that a three-factor model is appropriate to analyze the research questions.

The results of such a three-factor model are summarized in Table 10. The rotated results are generated assuming all of the questions asked in the questioners are orthogonal or independent from one to another. The orthogonal assumptions enable one to rotate the original factor model using varimax rotation method. Since this is an exploratory factor analysis then an unrestricted maximum likelihood estimator was appropriate. Hair et.al suggested that for a sample size equal to 50, the rule of keeping a certain variable is 0.75. For sample size of 30, the

significant cutoff point is 0.76 or higher and it is chosen to be 0.77 or higher for sample size less than 30. The sample size in this study is 53, 31 and 24 for Ozark, Delta and Uoachita regions, respectively. These are the decision rules applied whether to keep certain factor loadings in the final results. Based on this decision rule, one may find questions 8, 17, 18, 20 and 21in Ozark region to be significant. Therefore, the factor loadings will be kept. The significant of these factors imply that all three subscales being measured as presented in Table 7 are important. In addition, subscale trainings and promotion and advertising is also found to be significant in the Delta region as shown in question 13, 21 and 22. Potential three subscales are found significant in Uochita County as shown by question 3, 9, 20 and 21. However, question 3 is irrelevant to be included in this region because of the low alpha coefficient as shown in Table 7. Therefore, only two final subscales will be retained for Uoachita region which are trainings subscale and promotion and advertising. The analysis conducted in the regional level is more restricted and created more challenges to find a significant common factor loadings. Since the sample size is reduced, then the critical value for significant to find the factor loadings increase as well. But, this approach will ensure a higher confidence to make any inference, once the common factor loadings meet the cutoff criteria. In addition, conducting the analysis in the regional instead in the aggregate level is important to capture the diversity of agritourism activities due to different farm characteristics. For example, Ozark region is more mountainous than that of the Delta region. The characteristic differences between these two regions may lead to different type of crops or livestock operations and agritourism activities. Knowing which factors are more important in one region than others will help the policy makers to make the right decision to approach rural economic issues. State extension agencies will also be beneficial of knowing specific factors that are more relevant in certain counties, but the same factor may not important

in others. Identification of infrastructure issues and concerns are relevant especially in the newly development stage of agritourism industry in Arkansas. These regional findings add values and understanding on factors that affect operators' decision to participate in agritourism activities in Arkansas. The intuitive results of this study show the importance of initial state government support for agritourism in Arkansas.

Conclusion:

The results of this study will increase one's understanding of knowing the important but yet unobservable factors that affect Arkansas farmers' and landowners' decision to participate in the agritourism industry in different regions in Arkansas. Based on the Cronbach α coefficient three subscales were developed and these subscales are state's government support on training, certainty on laws and regulations and state government's support on marketing and promotion. These three subscales can then be condensed into one construct namely infrastructure. This finding is intuitive because agritourism in Arkansas is in its initial development stage. The results of this study will guide the policy makers and related state agencies such as agricultural extension agency to provide needed infrastructure to the operators to ensure a successful program in different region in Arkansas.

Table 8 - Variance-covariance Matrix of the Original Variables

Questions Asked	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
How valuable would finance, accounting and tax issues (1)	1.00																					
How valuable would liability insurance (2)	0.26	1.00																				
How valuable would property and water rights (3)	0.17	0.46	1.00																			
How valuable would estate and succession planning (4)	0.30	0.36	0.51	1.00																		
How valuable would legislation and government support (5)	0.26	0.25	0.29	0.19	1.00																	
How valuable would infrastructure development (6)	0.35	0.27	0.16	0.19	0.55	1.00																
How valuable would zoning and safety code issues (7)	0.33	0.23	0.36	0.29	0.30	0.25	1.00															
How valuable would grant resources (8)	0.40	0.18	0.11	0.25	0.40	0.46	0.45	1.00														
How much concern is promotion and marketing (9)	0.12	0.06	0.05	0.03	0.20	0.19	0.06	0.27	1.00													
How valuable would transportation and logistics (10)	0.41	0.21	0.26	0.18	0.24	0.24	0.31	0.34	0.13	1.00												
How valuable would advertising (11)	0.48	0.15	0.10	0.19	0.23	0.34	0.32	0.34	0.26	0.33	1.00											
How valuable would supply chain management (12)	0.29	0.29	0.39	0.40	0.21	0.24	0.44	0.38	0.04	0.39	0.28	1.00										
How valuable would identifying niche market opportunities (13)	0.33	0.43	0.33	0.35	0.39	0.35	0.39	0.46	0.17	0.01	0.20	0.45	1.00									
How valuable would restaurant and food service management (14)	0.20	0.49	0.31	0.35	0.24	0.17	0.23	0.32	0.23	0.27	0.20	0.39	0.30	1.00								
How valuable would lodging management (15)	0.10	0.45	0.31	0.25	0.27	0.21	0.35	0.34	0.20	0.18	0.30	0.31	0.36	0.59	1.00							
How useful would a book or resource guide on Arkansas agritourism (16)	0.14	0.09	0.11	0.00	0.45	0.23	0.08	0.37	0.25	0.12	0.16	0.15	0.22	0.12	0.16	1.00						
How useful would regional workshops on agritourism topics (17)	0.18	0.18	0.13	0.21	0.35	0.20	0.23	0.45	0.28	0.30	0.20	0.27	0.27	0.27	0.14	0.34	1.00					
How useful would fact sheet on specific agritourism topics (18)	0.26	0.26	0.15	0.11	0.53	0.20	0.42	0.43	0.25	0.20	0.12	0.22	0.41	0.27	0.31	0.50	0.56	1.00				
How useful would on-line training module agritourism (19)	0.28	0.20	0.06	0.07	0.26	0.26	0.17	0.32	0.36	0.26	0.30	0.19	0.19	0.13	0.20	0.37	0.61	0.49	1.00			
How useful would a college-level on agritourism to help you (20)	0.31	0.13	0.08	0.13	0.31	0.19	0.37	0.40	0.29	0.26	0.30	0.31	0.33	0.17	0.26	0.40	0.59	0.65	0.67	1.00		
How useful would periodic newsletter on agritourism to help you (21)	0.14	0.32	0.12	0.03	0.31	0.28	0.22	0.33	0.10	0.10	0.26	0.09	0.33	0.14	0.18	0.52	0.52	0.51	0.51	0.51	1.00	
How useful would news releases on agritourism topics (22)	0.18	0.23	0.06	0.09	0.31	0.24	0.18	0.25	0.09	0.12	0.28	0.16	0.16	0.15	0.12	0.32	0.48	0.37	0.51	0.48	0.54	1.00

Table 9 - Variance-covariance Matrix of the Unique Factors

Questions Asked	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
How valuable would finance, accounting and tax issues (1)	0.55																					
How valuable would liability insurance (2)	0.09	0.53																				
How valuable would property and water rights (3)	-0.02	0.04	0.59																			
How valuable would estate and succession planning (4)	0.03	0.00	0.14	0.64																		
How valuable would legislation and government support (5)	0.01	-0.06	0.05	-0.04	0.66																	
How valuable would infrastructure development (6)	0.04	0.04	-0.05	-0.04	0.29	0.74																
How valuable would zoning and safety code issues (7)	-0.03	-0.09	0.06	-0.03	-0.01	-0.06	0.64															
How valuable would grant resources (8)	0.00	-0.10	-0.13	-0.03	0.04	0.12	0.06	0.54														
How much concern is promotion and marketing (9)	-0.06	-0.03	0.00	-0.04	0.02	0.03	-0.10	0.04	0.86													
How valuable would transportation and logistics (10)	0.02	0.05	0.09	-0.05	0.01	-0.04	0.00	-0.01	-0.03	0.67												
How valuable would advertising (11)	0.07	0.02	-0.03	-0.02	-0.01	0.05	0.00	-0.04	0.08	-0.02	0.62											
How valuable would supply chain management (12)	-0.08	-0.06	0.04	0.03	-0.08	-0.07	0.06	0.00	-0.10	0.07	-0.04	0.58										
How valuable would identifying niche market opportunities (13)	0.06	0.00	-0.04	0.01	0.04	0.06	0.04	0.10	0.02	-0.22	-0.03	0.08	0.57									
How valuable would restaurant and food service management (14)	-0.03	0.07	-0.09	-0.01	-0.06	-0.07	-0.10	0.03	0.13	0.06	0.01	0.03	-0.10	0.60								
How valuable would lodging management (15)	-0.12	0.03	-0.06	-0.09	-0.03	-0.03	0.03	0.04	0.09	-0.02	0.12	-0.04	-0.03	0.20	0.62							
How useful would a book or resource guide on Arkansas agritourism (16)	0.01	-0.08	0.04	-0.05	0.16	0.05	-0.10	0.09	0.07	0.01	0.01	0.02	-0.01	-0.03	-0.01	0.65						
How useful would regional workshops on agritourism topics (17)	-0.08	-0.03	0.03	0.10	-0.03	-0.07	-0.05	0.05	0.02	0.08	-0.06	0.05	-0.04	0.07	-0.09	-0.09	0.46					
How useful would fact sheet on specific agritourism topics (18)	0.04	-0.04	-0.03	-0.04	0.11	-0.07	0.11	0.02	0.00	0.00	-0.11	-0.03	0.03	0.00	0.01	0.05	0.01	0.40				
How useful would on-line training module agritourism (19)	0.01	0.08	0.04	0.03	-0.09	0.00	-0.09	-0.08	0.09	0.02	0.01	0.00	-0.06	0.00	0.04	-0.06	0.06	-0.06	0.41			
How useful would a college-level on agritourism to help you (20)	-0.01	-0.05	0.00	0.03	-0.09	-0.12	0.07	-0.05	0.00	-0.01	-0.02	0.07	0.02	-0.02	0.05	-0.05	0.00	0.06	0.06	0.35		
How useful would periodic newsletter on agritourism to help you (21)	0.01	0.10	0.01	-0.04	-0.04	0.07	0.01	0.00	-0.12	-0.02	0.11	-0.07	0.03	-0.04	-0.04	0.09	0.01	-0.05	-0.01	-0.04	0.46	
How useful would news releases on agritourism topics (22)	0.00	0.08	0.01	0.03	0.01	0.04	-0.02	-0.06	-0.12	-0.04	0.09	0.01	-0.07	0.02	-0.05	-0.03	0.03	-0.10	0.05	0.00	0.10	0.62

Table 10 - Common Factors in Three Regions in Arkansas

Questions Asked	Ozark			Delta			Uoachita		
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3
How valuable would finance, accounting and tax issues (1)	0.109	0.502	0.487	0.162	0.491	0.228	0.163	0.018	0.326
How valuable would liability insurance (2)	0.121	0.702	0.188	0.677	-0.163	0.425	0.316	-0.074	0.656
How valuable would property and water rights (3)	0.159	0.532	0.159	0.725	-0.070	-0.066	-0.117	-0.106	0.857
How valuable would estate and succession planning (4)	0.005	0.459	0.033	0.730	0.274	-0.006	0.042	-0.105	0.709
How valuable would legislation and government support (5)	0.358	0.233	0.417	0.675	0.181	0.300	0.030	0.755	0.044
How valuable would infrastructure development (6)	0.054	0.158	0.655	0.622	0.274	0.366	0.146	0.426	0.027
How valuable would zoning and safety code issues (7)	0.217	0.492	0.376	0.471	0.606	-0.159	0.426	0.042	0.278
How valuable would grant resources (8)	0.311	0.169	0.821	0.580	0.550	0.138	0.301	0.514	0.017
How much concern is promotion and marketing (9)	0.329	0.177	0.143	0.114	0.134	0.262	-0.279	0.774	-0.144
How valuable would transportation and logistics (10)	0.223	0.512	0.272	0.026	0.686	0.053	-0.236	0.399	0.387
How valuable would advertising (11)	0.065	0.457	0.375	-0.035	0.575	0.221	0.499	0.318	0.215
How valuable would supply chain management (12)	0.154	0.530	0.243	0.501	0.596	-0.065	0.227	0.247	0.668
How valuable would identifying niche market opportunities (13)	0.212	0.412	0.441	0.780	0.107	0.221	0.546	0.053	0.179
How valuable would restaurant and food service management (14)	0.120	0.621	0.053	0.704	0.147	0.164	0.084	0.317	0.703
How valuable would lodging management (15)	0.110	0.638	0.032	0.674	0.202	0.176	0.278	0.298	0.314
How useful would a book or resource guide on Arkansas agritourism (16)	0.678	-0.136	0.318	0.329	0.059	0.367	0.307	0.672	-0.015
How useful would regional workshops on agritourism topics (17)	0.842	0.224	0.074	0.251	0.440	0.387	0.575	0.133	0.024
How useful would fact sheet on specific agritourism topics (18)	0.793	0.203	0.090	0.549	0.339	0.494	0.494	0.437	0.039
How useful would on-line training module agritourism (19)	0.728	0.224	0.096	-0.066	0.331	0.721	0.319	0.641	0.284
How useful would a college-level on agritourism to help you (20)	0.826	0.242	-0.020	0.093	0.705	0.476	0.769	0.337	0.114
How useful would periodic newsletter on agritourism to help you (21)	0.748	0.069	0.279	0.205	-0.097	0.826	0.859	-0.004	-0.141
How useful would news releases on agritourism topics (22)	0.657	0.053	0.109	0.120	0.193	0.757	0.451	0.020	0.155

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