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Estimation of Cattle Insurance Demand in Turkey through Count Data Method: The Case of TRA1 Region

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ABSTRACT

Agriculture sector faces natural, social and economic risks resulting from its production structure. One of the strategies to be used to transfer such risks is agricultural insurance. It was aimed in the present study to estimate the demand of farmers for cattle insurance (CI) and determine the effective factors which can increase the share of premium production of CI in total premium production of agricultural insurance in TRA1 Region. Data were obtained from 122 farms determined using proportional sampling method in the provinces of Erzurum, Erzincan and Bayburt (TRA1 Region) through a questionnaire survey. Count Data Model was used in convenience with the aim of the study. According to the results obtained, when premium cost of CI increased 3 folds, then the number of animals desired to be insured decreased by nearly 1-fold. In addition, when the budget allocated for agricultural production and the probability of animal disease both increased by 1%, the number of animals desired to be insured increased by 1.56% and 0.61%, respectively.

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Türkiye'de Büyükbaş Hayvan Hayat Sigortası Talebinin Count Data Yöntemiyle Tahmini: TRAI Bölgesi Örneği

ÖZET

Tarım sektörü üretim yapısından kaynaklanan doğal, sosyal ve ekonomik risklerle karşı karşıyadır. Bu riskleri transfer edebilmek için kullanılabilecek stratejilerden biri tarım sigortasıdır. Bu çalışmada TRA I Bölgesinde faaliyet gösteren tarım işletmelerinde, çiftçilerin büyükbaş hayvan hayat sigortası talebinin tahmini ve büyükbaş hayvan hayat sigortası prim üretiminin toplam tarım sigortaları prim üretimi içerisindeki payının artırılabilmesinde etkili olan faktörlerin belirlenmesi amaçlanmıştır. Oransal örnekleme yöntemiyle belirlenen 122 işletme ile Erzurum, Erzincan ve Bayburt illerinde (TRA I Bölgesi) anket yapılarak veriler toplanmıştır. Çalışmanın amacına uygun olarak Count Data Modeli kullanılmıştır. Elde edilen sonuçlara göre büyükbaş hayvan hayat sigorta prim fiyatı 3 katına çıktığında sigortalatılmak istenen hayvan sayısı yaklaşık 1 baş azalmaktadır. Tarımsal üretime ayrılan bütçe ve hayvanların hastalanma ihtimali %1 arttığında sigortalatılmak istenen hayvan sayısı sırasıyla %1.56 ve %0.61 artmaktadır.

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INTRODUCTION

Agriculture as a sector is the indispensable part of overall economic system. Importance of the sector in overall economic system can be estimated by the share of value added it creates (Ege, 2011). In Turkey, the rate of agriculture sector is 6.6% in GDP, 11.3% in employment in 2018 (TİM, 2018. Such data is important to imply that the sector still maintains its rightful place in economy and human life.

Because agricultural production is an economic activity based on natural conditions, it faces many risks and uncertainties

Agricultural insurance, natural (hail, frost, drought etc.) affecting agricultural production), social

(migration, war) and economic risks (such as inflation, fluctuations in oil, product and input prices) are one of the easiest ways to overcome their impact (İkikat Tümer, 2011; Terin and Aksoy, 2015; İkikat Tümer et al, 2019).

In the total world agricultural insurance premium production, vegetable product insurance is ranked first with 90% and animal life insurance is ranked second with 4% rate (Yazgı and Olhan, 2017). In Turkey, these figures are 55% for crop product insurance and 34% for cattle insurance. The rate of insured animal livestock was 0.05% in 2006 going up to 4% by 2018 (TARSIM, 2020). However, it may be thought when the number of animal livestock is considered which is 14 million that the rate of livestock animals to be insured is 96-97%.

Farm owners working in accordance with the commercial regulations in TRA1 NUTS II Region, covering the provinces of Erzurum, Erzincan and Bayburt and having severe continental climatic characteristics, need to use their own resources at their best under risks and uncertainties. Therefore, understanding consumer behaviours, determination of marketing strategies for farms and consumer demand estimation analysis are also strategically important in agricultural policy making in Turkey.

Articles about insurance demand have been getting more attention in recent years. Cotton producers' insurance claim in Burkina Faso (Sarfilippi et al, 2015), corn producers' insurance claim against climate change in Bangladesh (Akter et al, 2017), flood insurance claim in the Netherlands (Robinson and Botzen, 2020), climate change and index insurance demand (Dougherty et al) in Tanzania., 2020) have been calculated. Kim et al., (2005) also calculated the factors influencing the adoption of best management practices by cattle producers analyze using negative binomial regression analysis.

Demand and demand flexibilities of agricultural insurances have an important share in planning newly developing agricultural insurance sector and shaping its organisation in Turkey. Demand estimation is needed by agricultural insurance companies and TARSIM (Agricultural Insurance Pool) in planning insurance production. Demand flexibilities are important information sources for future prospects and projections.

Aimed of this present study was to determine the effective factors on the increase of the share of CIpremium production in total agricultural insurance premium production and to estimate the demands of farmers for CI who conduct agricultural activities in TRA1 NUTSII Region. It was also targeted to create source for public and private institutions to provoke and raise agricultural insurance awareness.

MATERIAL and METHOD

Main material of the study is made up of production data obtained from farmers living in TRA1 NUTSII Region (covering the provinces of Erzurum, Erzincan and Bayburt) in 2009. Sampling volume was calculated using proportional sampling method. p=0.5 was taken to reach the maximum sample volume. (Newbold, 1995).

$$n = \frac{N * p * (1-p)}{(N-1) * \sigma_p^2 + p * (1-p)}$$

$$n = \frac{61832 * 0.5 * 0.5}{61831 * 0.00205 + 0.5 * 0.5} \cong 122$$

$$\sigma_p^2 = \left(\frac{r}{Z_{\alpha/2}}\right)^2 \qquad \sigma_p^2 = \left(\frac{0.075}{1.645}\right)^2 = 0.00205$$

In the formula; n:sample size, N:number of farm in the population, σ_p^2: variance of the ratio, r:margin of error allowed from the average (7.5%), $Z_{\alpha/2}$:Z value (1.645), p: shows the possible proportion of producers (50%).

122 the survey was distributed proportionally to provinces, districts and villages, taking into account the number of farmers. Totally 122 questionnaire survey forms were completed in 3 provinces, 15 districts and 30 villages, and the obtained data were used in analyses.

Count Data Models

Count data is referred to the number of repetitions of any given event as the result of the trials conducted at a definite time. The number of cigarettes consumed on a day, customers coming to a shopping centre during daytime, forest fires occurring in a year, yearly CI etc. can be given as example for count data (Frome et al., 1973; Deniz, 2005). When dependent variable represents events seen in a certain time period, Poisson and Negative Binomial regression analyses can be used (Frome et al., 1973;McCullagh and Nelder, 1989; Cameron and Trivedi, 1998). In Poisson distribution, average and variance refer to the same value. If the distribution is not even and equal, over- or under-dispersion can be seen. On such conditions, poisson regression cannot be applied. When variance is larger than average Negative Binomial Regression (NBR) models are applicable (Cameron and Trivedi, 1998; Winkelmann 1998, 2008). NBR uses log linkage function between dependent variable and independent variable vector. NBR model is given as follows

$$\Pr(Yi = y_i | x_i) = \frac{\Gamma(y_i + \alpha^{-1})}{y_i! \Gamma(\alpha^{-1})} \left(\frac{\lambda_i \alpha}{1+\lambda_i \alpha}\right)^{y_i} \left(\frac{1}{1+\lambda_i \alpha}\right)^{\alpha^{-1}} \quad \alpha > 0 \ (1)$$

where α is the additional parameter value

representing the degree of over-dispersion. If α is zero then NB and poisson refer to the same dispersion. The bigger the value of α is, the more the dispersion of data is. Average and variance are defined in NBR model as follows (Lawless, 1987; Lambert, 1992; Cheung, 2002).

$$E(y_i|x_i) = \lambda_i \quad (2)$$

$$Var(y_i|x_i)_{NB} = \lambda_i(x) + \alpha\lambda_i^2 \quad (3)$$

Standard Poisson and Zero Inflated NB count data can be used to express additional zeros in dependent variables. Alternative regression method in the modelling of dependent variable y_i, where zero values are too high, is Zero Inflated Negative Binomial Regression (ZINB) model. The model can be written as follows.

$$\Pr(Y_i) = \begin{cases} \pi_i + (1-\pi_i)\left(\frac{1}{1+\alpha\lambda_i}\right)^{1/\alpha} & y_i = 0 \\ (1-\pi_i)\frac{\Gamma\left(y_i+\frac{1}{\alpha}\right)}{y!\Gamma\left(\frac{1}{\alpha}\right)}\left(\frac{1}{1+\alpha\lambda_i}\right)^{1/\alpha}\left(\frac{\alpha\lambda_i}{1+\alpha\lambda_i}\right)^{y_i} & y_i = 1,2,3,... \end{cases} \quad (4)$$

Γ is gamma function and α is dispersion parameter. Average and variance in ZINB model can be expressed as follows.

$$E(y_i) = (1-\pi_i)\lambda_i$$

$$Var(y_i)_{ZINB} = (1-\pi_i)[1+\lambda_i(\alpha+\pi_i)]\lambda_i \quad (5)$$

Farmers' desire to make CI was evaluated through binomial method (e.g. Logit, Probit) in zero inflated count data model while standard count model was used to analyse the number of animals for which farmers desired to make CI (Cameron and Trivedi, 1998).

It was determined that some of the epidemic veterinary disease were seen beginning from 20 years ago to recent years. Based on such findings, animals were supposed to catch illness in the probability rates of 5%, 7.5%, 10%, 12.5% and 15%. The number of animals up to ten for which farmers wanted to make insurance in a year time under the risk of a certain disease tried to be determined.

In the model, since α is >1, over dispersion is in question in data clusters. In a such situation, Negative Binomial Regression was used more preferably (Cameron and Trivedi, 1998; Yeşilova et al., 2007). Binomial Logit Model was shaped for the farmers wanting not to make CI (Table 3). Dependent variable is farmers' decision to make CI. In order to compare the results of Logit model and Count Data model of Negative Binomial Regression, signs of variables obtained as the result of Binomial Logit model were reversed and commented (Isgın et al., 2008; Bilgic et al., 2009).

In ZINB model, the number of animals for which farmers desired to make CI is dependent variable. Depending on the number of animals, farmers don't want to make CI due to the factors such as lack of income or awareness and therefore, dependent variable gets the value of zero and ZINB regression model was used in the study.

RESULTS and DISCUSSION

The result of analysis indicated that 56.6% of the farmers surveyed were those who prefer prudent and least risky investments and were in the risk averse group. Yet, 22.1% of farmers were risk-takers, stable, capable of managing risk, economically most ideal, and were in the risk-neutral group until their expected income get the highest. The proportion of adventurous farmers who like risky investments in the region was 21.3% and they were in the risk-taking group (İkikat Tümer and Birinci, 2013).

Their ages ranged between 22 to 80 (mean age was 45.15) of years and mean education time was 6.52 years. Mean number people of households was found to be 5.95 and 2.98 of whom were working in agricultural production. Farmers interviewed stated that they had an average experience of 27.53 years in agricultural production. Among the farmers participating in the study, 29% did not have any membership of a cooperative (Table 1). Social security is the provision of an income guarantee with people on which they can live against the risks including the possibility of losing their jobs current and in coming years (Anonymous, 2009). The rate of farmers under the umbrella of social security in the study area was 83% (Table 1), which was 93.43% in whole country (SGK, 2019). The types of agricultural production activity the interviewed farmers conducted in the region were detected to be plant production, animal production and both in the rates of 18.85%, 5.74% and 75.41%, respectively. Mean yearly income of the farmers participating in the study by completing questionnaire surveys was found to be ₺13.322,13, ₺9.109,02 of which was found to be left for agricultural production again. The rate of farmers working also out of agriculture sector was determined to be 43% and obtain a mean yearly income of ₺7.592,31 from the activities out of agriculture. Farmers participating in the study were found to possess 98.76 da land and 14.69 livestock animals on the average. Mean daily milk yield of livestock animals in the farms in the region was determined to be 4.58 kg/day. Farmers were determined to be aware of agricultural insurance in the rate of 32% and 57%of them stated that they wanted to make insurance for plant products. Farmers producing animal productions stated that they wanted to make insurance for only 1.78 of 10 livestock animals.

Table 1. Descriptive statistics belonging to farmers
Çizelge 1. Çiftçilere ait tanımlayıcı istatistikler

	Minimum *Minimum*	Maximum *Maksimum*	Mean *Ortalama*	Std. Dev. *Std. Sapma*
Age	22.00	80.00	45.15	13.803
Education	0.00	15.00	6.52	2.896
Education (primary school)	0.00	1.00	0.40	0.492
Education (secondary school)	0.00	1.00	0.82	0.386
Number of individuals in the family	2.00	16.00	5.95	2.374
Number of individualsemployed in agriculture	1.00	12.00	2.98	2.212
Experience	4.00	65.00	27.53	14.005
Membership of a cooperative	0.00	10.00	0.29	0.454
Social security	0.00	10.00	0.83	0.379
Agricultural income	800.00	75000.00	13322.13	12614.903
Budget left for agriculture	800.00	60000.00	9109.02	9201.336
non-agricultural income	200.00	30000.00	7592.31	4848.021
Owning an investment apart from farm	0.00	1.00	0.51	0.501
Lands (da)	0.00	920.00	98.76	165.486
Total amount of livestock (animal number)	0.00	85.00	14.69	17.030
Milk yield per cow (l/day)	0.00	15.00	4.58	3.362
The number of animals desired to be insured	0.00	10.00	1.78	2.913
Disease probability of animals	5.00	15.00	9.84	3.55
CI premium cost	54.00	162.00	111.34	35.33

Cost of one dairy livestock animal was ₺2000 in the provinces of Erzurum, Erzincan and Bayburt in 2010.

Totally 55 of 122 farmers interviewed wanted to make insurance for at least one of their animals. In other words, the rate of farmers desiring to make CI for at least one animal was calculated to be 45.10%. Mean number of animals for which farmers desired to make CI was found to be 1.78. Among 122 farmers, 67 (54.90%) did not want to make insurance for none of their 10 animals. Therefore, the rate of zero observation should be taken into consideration. The rate of farmers desiring to make CI for more than 3 and 4 animals was found to be 61.81% and 38.18%, respectively.

In the Logit model, the dependent variable was the decision of farmers to take out cattle insurance. In the ZINB model, the number of animals desired to be insured was a dependent variable.

According to the alpha test result ($p<0.01$), H_0hiotesis is rejected and NBR analysis is decided. When variance of the dependent variable (2.913) is greater than its mean (1.78), ZINB regression models are appropriate to use (Cameron and Trivedi, 1998; Winkelmann 1998, 2008).

Therewas positive relationship between desire to make CI and the membership of a cooperative. Farmers member of a cooperative were open to innovations and new ideas more than others and wanted larger number of animals to be insured compared to others. This relation was statistically significant ($p<0.10$). Making CI is negatively affected by farmers' ownership of investment out of farms. Farmers having investment out of farm relied on this investment and did not want to make CI. This relation was statistically significant ($p<0.10$). There was a positive relationship between making CI and daily milk yield per cow. As the rate of milk farmers provided per cow increases, desire to make CI increased to ensure the survival of animals. Such a relationship was statistically significant ($p<0.05$). Table 2 gives the factors affecting the number of animals desired to be insured in a year. Dependent variable is the number of animals for which farmers desire to make CI. This number was affected negatively by income from agricultural activities. As farmers' income from agriculture increases, their self-confidence also increases and think they can meet the expenses when an animal catches disease. This situation was statistically significant ($p<0.01$). There was a positive relationship between the number of animals to be insured and the size of budget left for agricultural production. As the amount of money farmers spend on agricultural production increases, the number of animals desired to be insured also increases since they want to take back their investment. This relationship was statistically significant ($p<0.01$). The number of animals desired to be insured was affected positively by the probability that animals may catch disease. As the probability of catching disease in a year increases, farmers want to make insurance for their animals and the number of animals to be insured also increases. Such a situation was statistically significant ($p<0.05$) (Table 2).

Table 2. The number of animals for which farmers wished to make CI
Çizelge 2. Çiftçilerin büyükbaş hayvan hayat sigortası yaptırmak istediği hayvan sayısı

Variables *Değişkenler*	Decision of cattle insurance *Büyükbaş hayvan hayat sigortası kararı*			The number of animals desired to be insured *Sigortalatılması istenen hayvan sayısı*		
	Coefficient *Katsayı*		**t value** *t değeri*	**Coefficient** *Katsayı*		**t value** *t değeri*
Constant	0.6826		0.6160	1.1160	**	2.0320
Age				0.0093		1.1170
Experience	0.5290		1.2350			
Education (those educated secondary school:1, other:0)	-0.6813		-1.0180	-0.1085		-0.4260
Number of individuals employed in agriculture	-0.0288		-0.2080	-0.0025		-0.0540
Agricultural Income				-0.0001	*	-4.2480
Budget				0.0002	*	3.7070
Disease probability of animals				0.0515	**	2.2150
CI premiumprice				-0.0078	**	-2.2500
Rate of arable land ownership (50 da and more:1, other:0)	-0.8779		-1.4510			
Membership of a cooperative	-1.4494	***	-1.8300			
Owning an investment apart from farm	1.1919	***	1.8560			
Milk yield per cow (l/day)	-0.2227	**	-2.4560			
Erzurum	0.2878		0.4250	-0.3471		-1.1910
Erzincan	0.7643		1.0020	0.0199		0.0690
Neutral risk group	0.4276		0.6200	1.0396	*	4.8160
Alfa	2.0729	*	3.3320	0.0213		0.2670
Log_Likelihood			-170.2711			
Vuong Test: ZINB			4.1223			
VuongTest:ZINB-HNB			6.7445			
VuongTest:HNB-NB			-2.3447			
AIC						

*,**,*** statistical significance at 0.01, 0.05 and 0.10 probability levels.
Alfa test H_0: convenient with Poisson distribution.
Voung test H_0: convenient with Negative Binomial Regression with increased zero.
Bayburt is taken to be reference group.

There was a negative relationship between the number of animals to be insured and the cost of CIpremium. As the latter increased the number of animals to be insured decreased. Such a condition was suitable with economic theory and the relationship was statistically significant ($p<0.05$). When CIpremium price increased by₺ 1 the number of animals to be insured decreased by 0.0299 (-0.0078*3.8305=-0.0299, where -0.0078 is the coefficient of CIpremium price (Table 2) and 3.8305 is the (conditional mean) estimated value of the number of animals desired to be insured by farmers (Table 4). Farmers in neutral risk group wanted significantly more animals to be insured than others ($p<0.01$).

Table 3 represents conditional and unconditional flexibilities. Unconditional flexibility is calculated for all farmers. Conditional flexibilities are evaluated in the study since they are related to farmers desiring to make CI (67 farmers). There was a negative relationship between making CI and the rate of income from agriculture. When agricultural income increases by 1% then the number of animals desired to be insured decreases by 1.75%.

Therewas a positive relationship between the desire to make CI and the budget left for agriculture. When the budget increased by 1%, the number of animals desired to be insured increased by 1.56% (Table 3).

There was a positive relationship between the probability of making CI and animal diseases. When the probability of veterinary diseases increases by 1% the number of animals desired to be insured increases by 0.61%. In addition, a negative relationship was detected between desire to make CI and insurance premium cost. When CI premium cost increased by 1%, the number of animals desired to be insured decreased by 0.87%. There was another positive relationship between the desire to make CI and the group neutral

to risk. The number of animals for which those in neutral group desire to make insurance is 0.23% larger than the others (Table 3).

Table 3. Conditional and unconditional flexibilities
Çizelge 3. Koşullu ve koşulsuz elastikiyetler

Variables *Değişkenler*	Conditional flexibility *Koşullu elastikiyet* Coefficient *Katsayı*		t value *t değeri*	Indirect flexibility *Dolaylı elastikiyet* Coefficient *Katsayı*	t value *t değeri*	Unconditional flexibility *Koşulsuz elastikiyet* Coefficient *Katsayı*		t value *t değeri*
Constant	1.1160	**	2.0320	-0.3385	-0.4540	0.7775		0.8170
Age	0.4182		1.1170					
Experience				-0.5161	-0.6550	-0.4979		-0.6170
Education (secondary school:1)	-0.0890		-0.4260	0.2769	1.1680	0.1880		0.6330
Population employed in agriculture	-0.0073		-0.0540	0.0426	0.0460	0.0353		0.0380
Income obtained from agriculture	-1.7513	*	-4.2480					
Budget	1.5599	*	3.7070					
Disease probability of animals	0.6077	**	2.2150					
CI premium price	-0.8714	**	-2.2500					
Rate of arable land ownership (50 da and more:1)				0.2248	1.6070	0.2248	***	1.7660
Membership of a cooperative				0.2062	** 2.2630	0.2062	**	2.2910
Owning an investment apart from farm				-0.1647	-1.1210	-0.1504		-1.0090
Milk yield per cow (l/day)				0.5055	0.3890	0.4697		0.3640
Erzurum	-0.1479		-1.1910	-0.0608	-0.3140	-0.2088		-0.9420
Erzincan	0.0059		0.0690	-0.1118	-0.7000	-0.1060		-0.6060
Neutral risk group	0.2301	*	4.8160	-0.0469	0.4450	0.1831		1.5760

*,**,*** statistical significance at 0.01, 0.05 and 0.10 probability levels.
Bayburt is taken to be reference group.

Table 4 gives the real and estimated averages of the probability of farmers' desire to make CI. According to real values, although 45.08% of farmers desired to make CI, this rate was determined to be 50.41% in the model and 54.92% and 49.59% of farmers undesired to make CI in real and model, respectively. There is a difference of 5.33% between real and estimated values, and such a difference shows that the model is close to real values.

Conditional average means the average yearly number of animals to be insured by only the farmers desiring to make CI. This number was estimated to be 3.95 in real values while 3.83 in the model. The difference between two values is 0.12, which is very close to real value.

The number of animals desired to be insured in real values from surveyed 122 farms was estimated to be 1.78 while being 1.85 in model. The difference between two values is 0.07, which shows that the model reflects real values very well.

Table 4. Conditional and unconditional averages
Çizelge 4. Koşullu ve koşulsuz ortalamalar

	Real (*Gerçek*)	Estimated (*Tahmini*)
	Average value (*Ortalama değer*)	Average value (*Ortalama değer*)
Probability	0.4508	0.5041
Conditional average	3.9455	3.8305
Unconditional average	1.7787	1.8527

Note: Probability means the chance to make CI by giving 1 and 0 to whoever desired and undesired to make CI, respectively. Conditional average means the average number of animals to be insured by only the farmers desiring to make CI. Unconditional average means the average number of animals to be insured by both the farmers desiring and undesiring to make CI.

CONCLUSION

In the present study, it was aimed to estimate the demand of farmers performing agricultural production activities in TRA1 NUTSII Region for CI. Data were obtained from the region through questionnaire forms from 122 farms.

The study shows that various factors may affect CI trends. In this respect, it was determined that when income from agriculture increased by 1%, the number of animals to be insured decreased by 1.75%. Yet, while the number of animals to be insured increased by 1.56% the budget rested for agricultural production increased by 1%. In addition, it was determined that as the insurance premium cost increased, the number of animals to be insured decreased, which is also confirmed by demand theory. However, when the probability of animal (veterinary) disease increased by 1%, the number of animals desired to be insured increased by 0.61%. Distribution map of veterinary diseases should be prepared throughout the country, required measures should be taken for the diseases and farmers should be aware of such consequences.

The study results indicated that the number of animals for which farmers wish to make insurance was estimated to be 3.83 per farmer. In addition, when insurance premium cost increased by 1%, the number of animals desired to be insured decreased by 0.87%. Farmers' attention should be attracted to the insurance by applying discounts in insurance premiums in order to increase the number of insured livestock animals (at present 3%) and premium production (34% at present).

It is possible to state that farmers have yet not developed consciousness towards insurance. Therefore, they should be informed through mass communication devices such as television, radio and SMS about the importance, types and scopes of agricultural insurances, insurance premium account, toll detection and compensation payments. After that, seminaries should be organised to şnform farmers about agricultural insurances by determining pilot zones.

Statement of Conflict of Interest

Authorshavedeclarednoconflict of interest.

Contribution of the Authors as Summary

Authorsdeclaresthecontribution of theauthors is equal.

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REFERENCES

Akter S, Krupnik TJ, Khanam F 2017. Climate Change Skepticism and Index Versus Standard Crop Insurance Demand In Coastal Bangladesh. Reg Environ Change 17: 2455-2466. https://doi.org/10.1007/s10113-017-1174-9

Anonymous 2009. Temel Kavramlar. http://www.halkinbirligi.net/modules.php?name=News&file=article&sid=1098.(Erişim tarihi:28.08.2009)

Bilgic A, Florkowski JW, Akbay C 2009. Demand for Cigarettes in Turkey: AnAplication of Count Data Model.EmpirEconomics39:733-765.

Cameron A, Trivedi PK 1998. Regression Analysis of Count Data. Cambridge University Press, Cambridge, 411 p.

Cheung YB 2002. Zero-inflated Models for Regression Analysis of Count Data: A Study of Growth andDevelopment.Stat Med 21:1461–1469.

Deniz Ö2005. Poisson RegresyonAnalizi. İstanbul TicaretÜniversitesi Fen BilimleriDergisi 4(7): 59-72.

Dougherty JP, Flatnes JE, Gallenstein RA, Miranda MJ, Sam AG 2020. ClimateChangeand Index InsuranceDemand: EvidenceFrom A FramedField Experiment in Tanzania, Journal of Economic Behavior and Organization 175: 155 184.

Ege H 2011. Tarım Sektörünün Ekonomideki Yeri ve Önemi. Tarımsal Ekonomi ve Politika Geliştirme Enstitüsü Tepgebakış 7: 1303–8346.

Frome EL, KunterMHBeauchamp JJ 1973. Regression Analysis of Poisson-Distributed Data. Journal of American Statistical Association 68(344): 935-940.

İkikat Tümer E 2011. Erzurum, Erzincan ve Bayburt İllerinde (TRA I Bölgesi) Çiftçilerin Riske Karşı Tutumları ve Olası Sigorta Primlerinin Belirlenmesi Üzerine Bir Araştırma. Atatürk Üniversitesi Fen Bilimleri Enstitüsü Tarım Ekonomisi Ana Bilim Dalı, (Yayınlanmamış Doktora Tezi) 126 sy, Erzurum.

İkikat Tümer E, Ağır H, Uslu Z 2019. Çiftçilerin Tarım Sigortası Yaptırma İstekliliği: Konya İli Ilgın İlçesi Örneği. KSÜ Tarım ve Doğa Derg 22(4):571-576 .

Isgın T, Bilgic A, Forster DL, Batte MT 2008. Using Count Data Models to Determine the Factors Affecting Farmers' Quantity Decision of Precision Farming Tecnology Adoption. Computers and Electronic in Agriculture 62: 231-242.

Kim S, Gillespie JM, Paudel KP 2005. Count Data Analysis of theAdoption of Best Management Practices in Beef Cattle Production, Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meetings, LittleRock, Arkansas, February 5-9, 2005.

Lambert D 1992. Zero-inflated Poisson Regression with an Application to Defects in Manufacturing.

Technometrics 34: 1-14.

Lawless JF 1987. Negative Binomial and Mixed Poisson Regression. Canadian Journal of Statistics 15: 209–225.

McCullagh P, Nelder JA 1989. Generalized Linear Models. Monographs on Statistics and Applied Probability Chapman & Hall London 37p.

Newbold P 1995. Statistics for Business & Economics. Fourth Edition Prentice-Hall.

Robinson PJ, Botzen WW 2020. Flood Insurance Demand And Probability Weighting: The Influences Of Regret, Worry, Locus Of Control and The Threshold of Concern Heuristic. WaterResources And Economics, 30, 100144. https://doi.org/10.1016/ j.wre.2019.100144

Serfilippi E, Carter M, Guirkinger C 2015. Certain and Uncertain Utility and Insurance Demand: Results From a Framed Field Experiment in Burkina Faso, International Conference of Agricultural Economists, 29th Milan, Italy, 8-14 August 2015.

SGK, 2019. Türkiye Cumhuriyet Sosyal Güvenlik Kurumu. http://www.sgk.gov.tr.(Erişim tarihi 10.11.2019)

TARSİM, 2020. Tarım Sigortaları Havuzu http://www.tarsim.gov.tr.(Erişim tarihi 18.03. 2020).

Terin M, Aksoy A 2015. Devlet Destekli Bitkisel Ürün Sigortası Uygulama Sonuçları Üzerine Bir Araştırma: Ortadoğu Anadolu (TRB) Bölgesi Örneği. ÇOMÜ Ziraat Fakültesi Dergisi. 3(2):35-43.

TİM 2018. Türkiye İhracatçılar Meclisi Raporları http://www.tim.org.tr/tr/ihracat-ihracat-rakamlari-Tablelar.html. (Erişim tarihi 10.06.2018.)

Winkelmann R 1998. Count Data Models with Selectivity. Econometric Reviews 17(4):339-359.

Winkelmann R 2008. Econometric Analysis of Count Data. Springer-Verlag Berlin Heidelberg.

Yazgı FE, Olhan E 2017. Gelişmiş Ülkeler ve Türkiye'de Tarım Sigortası Sistemlerinin * Karşılaştırılması, Tarım Ekonomisi Dergisi 23(2):231-239.

Yeşilova A, Kaki B, Kasap İ 2007. Sıfır Değer Ağırlıklı Sayıma Dayalı Olarak Elde Edilen Bağımlı Değişkenlerin Modellenmesinde Kullanılan Regresyon Yöntemleri. TÜİK; İstatistik Araştırma Dergisi 5(1):1-9.