

# Proceeding of The First International Conference Technology on Biosciences and Social Sciences



ISBN 978-602-6381-22-4

**Proceeding**  
The First International Conference  
Technology on Biosciences and Social

**“Industry based on Knowledges”**  
17<sup>th</sup>-19<sup>th</sup> November 2016, Convention Hall, Andalas University

Organized by :  
Animal Science Faculty of Andalas University  
Co-organized by :  
Alumni Center of Universiti Putra Malaysia

Penerbit Lembaga Literasi Dayak (LLD)  
berkerja sama dengan Universitas Andalas, Padang

Proceeding of The First International Conference  
Technology on Biosciences and Social Sciences

**“Industry based on Knowledges”**  
17<sup>th</sup>-19<sup>th</sup> November 2016, Convention Hall, Andalas University

**“Industry based on Knowledges”**

17<sup>th</sup>-19<sup>th</sup> November 2016, Convention Hall, Andalas University



The Proceeding Of  
The 1<sup>st</sup> International Conference Technology on  
Biosciences and Social Science 2016

“Industry Based On Knowledges”

17<sup>th</sup> – 19<sup>th</sup> November 2016, Convention Hall, Andalas  
University, Padang, West Sumatera, Indonesia

**Organized by:**

**Animal Science Faculty of Andalas University  
and  
Alumbi Center of Universiti Putra Malaysia**

## Organizing Committee

### Steering Committee:

Rector of Andalas University  
Deputy Rector II Andalas University  
Dean of Animal Science Faculty  
Deputy Dean I of Animal Science Faculty  
Deputy Dean II of Animal Science Faculty  
Prof. Dr. Ir. Salam N. Aritonang, MS  
Prof. Dr. Ir. H.M. Hafil Abbas, MS  
Prof. Dr. Ir. Zaituni Udin, M.Sc

### Chairman :

Prof. drh. Hj. Endang Purwanti, MS., Ph.D

### Co-Chairman:

Prof. Dr. Ir. Hj. Husmaini, MP

### Secretary:

Dr. drh. Hj. Yulia Yellita, MP  
Afriani Sandra, S.Pt., M.Sc

### Secretariat:

Hendri Purwanto, S.Pt., M.Si  
Yunizardi, S.Pt.  
Arif Trisman, S.Pt.  
Rahmat Mulyadi, SE

### Treasurer :

Dr. Ir. Elly Roza, MS,

### Financial

Dr. Ir. Tinda Afriani, MP.  
Dr. Ir. Sabrina, MP

### Editors:

drh. H. Yuherman, MS., Ph.D; Dr. Ir. Rusmana Wijaya Setia Ningrat, M. Rur.Sc.; Dr. Ir. Masrizal, MS.; Dr. Ir. Firda Arlina, MP.; Indri Juliyarsi, SP., MP.; Deni Novia, S.TP., MP.; Sri Melia, S.TP., MP.; Aronal Arief Putra, S.Pt., M.Sc; Ferawati, S.Pt, MP.; Yulianti Fitri Kurnia, S.Pt, M.Si

### Meet and Greet of UPM Alumny

Prof. Dr. Marlina, Apt., MS.; Dr. Ir. Adrinal, MS.; Dr. P.K. Dewi Hayati, MS.

## Contents

	<b>Page</b>
Organizing Committee.....	ii
Content .....	iii
Preface .....	iv
List Paper of Oral Presentation .....	v
List Paper of Poster Presentation .....	xii
Keynote Lecturer .....	1
Papers of Oral Presentation .....	31
Animal Science.....	32
Agricultures.....	206
Medicenes, Public Health, Technics and Natural Sciences .....	380
Economy and Social Sciences .....	453
Papers of Poster Presentation .....	519

# Preface

## List Paper of Oral Presentation

No.	Author's	Title	Page
<b>ANIMAL SCIENCES</b>			
1.	Yulianti Fitri Kurnia and Endang Purwati	The Potential Of Dadiah From 50 Kota District, West Sumatera As a Probiotic Food Based On Total of Lactic Acid Bacteria	33
2.	Harissatria, Jaswandi, and Hendri	Acceleration Time Equilibration Cauda Epididymis Spermatozoa Buffalo with Addition of Antioxidant Gluthatione	37
3.	Jumatriatikah Hadrawi, Asep Gunawan, Niken Ulupi, and Sri Darwati	Association Analysis of NRAMP1 Gene Related to Resistance Against <i>Salmonella pullorum</i> Infection in Kampung Chicken	42
4.	Ahmad Saleh Harahap, Cece Sumantri, Niken Ulupi, Sri Darwati, and Tike Sartika	Polymorphism Calpain-3 (CAPN3) Gene and Association with Carcass Traits and Meat Quality in Kampung Chicken	47
5.	Wahyuni, Niken Ulupi and Nahrowi	Physical Quality of Broiler Meat Fed Diets Containing Mealworm Protein Concentrate	56
6.	Mega Sofia, Cece Sumantri, Niken Ulupi and Asep Gunawan	Identification Polymorphisms of Inos Gene and Association with Body Resistance Trait in Kampong Chicken	62
7.	Risky Naully Panjaitan, Niken Ulupi and Nahrowi	Investigation of Cadmium Contamination in Mealworm, Ration and Broilers's Feces	67
8.	Woki Bilyaro, Asep Gunawan, Tuti Suryati, Cece Sumantri, and Sri Darwati	Malonaldehyde and Fat Contents of Kampong-meat Type Crossbreed Chicken	71
9.	Devi Kumala Sari, Henny Nuraini and Tuti Suryati	Quality of Gelatin Processed from Chicken Legs ( <i>Tarsometa tarsus</i> ) Skin with Different Method	75
10.	Linda Suhartati, Asep Gunawan, Rukmiasih, Sri Darwati, Cece Sumantri, Tuti Suryati, and Isyana Khaerunnisa	Physical and Chemical Characteristic of Chicken Meat from Kampung x Meat Type Crossbred Chicken	80
11.	Teguh Rafian, Jakaria, Niken Ulupi, Yosi Fenita, and Muhammad Andriansyah	Evaluated the Effect of Fermented Palm Sludge on Burgo Chicken Performance	85

	Donald John Calvin Hutabarat, Fransisca Rungkat Zakaria, Endang Yuli Purwani, and Maggy Thenawidjaja Suhartono	SCFA Profile of Rice RS Fermentation by Colonic Microbiota, <i>Clostridium butyricum</i> BCC B2571, or <i>Eubacterium rectale</i> DSM 17629	89
	Asep Gunawan, Ahmad Furqon, Kasita Listyarini, Jakaria, and Cece Sumantri	Growth and Carcass Characteristic in Kampong x Broiler Crossbred Divergently Selected for Unsaturated Fatty Acid	100
12.	Niken Ulupi, Cece Sumatri and Sri Darwati	Resistance against <i>Salmonella pullorum</i> IPB-D1 Crossbreed, Kampong and Commercial Broiler Chicken	104
13.	Angelia Utari Harahap	Effects of Wheat Leaf Noni ( <i>Morinda citrifolia</i> ) on Carcass and Production Quail Eggs ( <i>Coturnix Coturnix Javonica</i> ) in the Different Level Concentrate	108
14.	Armein Lusi Zeswita, Vivi Fitriani and Nursyahra	Microbial Analysis on Freshwater Shell ( <i>Corbicula sumatrana</i> ) in Singkarak Lake Solok District West Sumatra	112
15.	Syaiful F. L, E. Purwati, Suardi, and T.Afriani	Analysis of Estradiol and Progesterone Hormone Levels Against Various Cell Culture in TCM- 199 Medium for Cattle <i>In vitro</i>	116
16.	Jhon Hendri and Harris Satria	Buffalo Embryo Maturation Optimization in Vitro with Addition Glutathione	125
17.	Khalil, Reswati, Y.F. kurnia, Indahwati and Yuherman	Blood Mineral Profiles of Simmental Breed Cattle with Different Feeding Systems and Reproduction Statues in Payakumbuh Region West Sumatra, Indonesia	130
18.	Lendrawati, A. Rahmat and J. M. Nur	Performance of Broiler Chicken Fed Turmeric and Zinc Mineral under Heat Stress	134
19.	Muslim	Utilization of Plant Titonia Flowers ( <i>Tithonia diversifolia</i> ) in The Ration on The Performans of Broiler	138
20.	Resolinda Harly, Almasdi and Sri Mulyani	Analysis of Factors Influence Palm Oil Farmers Personal Income Trough Buffalo's Breeding	144
21.	Retno Wilyani and Moch Hisyam Hermawan	Nutritional Value of Persimmon Yoghurt ( <i>Dyospyros kaki</i> ) as Healthy Soft Drink to Make Healthy and Fitness: An Analysis	148

22.	Fenita Y, Rafian T, Andriansyah M, Saepudin R, and Zain B	Evaluated the effect of fermented palm sludge on burgo chicken performance	157
23.	Zulfa Elymaizar, Arnim, Salam N Aritonang, Mardiaty Zein, and Elly Roza	In-Vitro Rumen Digestibility of Goat Feed by Patikan Kerbau ( <i>Euphorbia hirta</i> L.) Herbal Supplemented	161
24.	Salam N. Aritonang, Elly Roza and Lailya Rahma	The Adding of <i>Saccharomyces cerevisiae</i> on Moisture, Acidity and Lactic Acid Bacteria Colony Count of Yogurt from Goat's Milk	166
	Yuherman, Nur Asmaq and Endang Purwati	Characteristics and Antimicrobial Activity of Lactic Acid Bacteria Isolated from Dadih of Agam Regency	172
25.	Sri Melia, Endang Purwati, Yuherman, and Jaswandi	A Comparative Study on Composition and Microbiological of Buffalo Milk From Different Location in West Sumatra	177
26.	Yunizardi, Ade Rakhmadi and Endang Purwati	Effect of Addition White Oyster Mushroom ( <i>Pleurotus ostreatus</i> ) and Carrot ( <i>Daucus carota</i> L) In Probiotic Duck Nugget On Protein, Calcium and Organoleptic Value	182
27.	Tertia Delia Nova, Sabrina and trianawati	The Effect of level Flour turmeric ( <i>Curcuma domestica</i> Val) ration toward carcass local duck	191
28.	T. Astuti, G. Yelni, Nurhaita, and Y. Amir	Effect of the Form Complete Feed With Basis Fermented Palm Oil Fronds on the Content of Moisture, Crude Lipid, and Crude Protein for Ruminants	202
<b>AGRICULTURES</b>			
29.	I Ketut Budaraga, Arnim, Yetti Marlida dan Usman Bulanin	Effect Of Combination Treatment Of Liquid Smoke Concentration, Soaking Time, Packaging And Different Storage Time To Yield And Moisture Content Nila Fish Fillet ( <i>Oreochromis Niloticus</i> )	207
30.	M. Said Siregar, Arif Kurniawan and Syakir Naim Siregar	Study On The Manufacture Of Nuggets From Natural Rubber Seed ( <i>Hevea Brasilinsis</i> Mull. Arg)	218
31.	Misril Fuadi, Mahmud T.M. Mohamed, Mohd. Fauzi Ramlan, Yahya Awang	Effect Of Benzyladenine (BA) And Duration Of Shading On Growth And Quality Of <i>Dracaena Sanderiana</i> And <i>Codiaeum Variegatum</i>	228



32.	Azwar Rasyidn, Gusmini, Ade Fitriadi and Yulmira Yanti	Soil Microbes Diversity Between Hilly and Volcanic Physiography And Their Effect To Soil Fertility	236
33.	Dafni Mawar Tarigan, Bambang SAS, and Hasanul Arifin Marmen	Application of Green Manure and Rabbits Urine Affect Morphological Characters of Sweet Corn Plant ( <i>Zea mays saccharata</i> Sturt) in Lowland of Deli Serdang District	246
35.	Dewi Rezki, Siska Efendi, and Herviyanti	Humic Substance Characterization of Lignite as a Source of Organic Material	251
36.	Jamilah, Sri Mulyani and Juniarti	Nutritional Composition of Ruminant Forage Derived from Rice Crops ( <i>Oryza Sativa</i> L.) that Applied by <i>C.odorata</i> Compost	254
37.	Mega Andini, Riska, and Kuswandi	Effectiveness of Liquid Smoke to Control Mealybug on Papaya	262
38.	Muhammad Thamrin, Desi Novita, Fitria Darma	Factors Affecting Farmers Decision to Convert Wetland	266
39.	Riry Prihatini, Yulia Irawati, Yosi Zendra Joni, and Sri Hadiati	The Occurrence of Somaclonal Variation on The Pineapple <i>In vitro</i> Culture as Detected by Molecular Markers	277
40.	Riska and Jumjunidang	Competitiveness of <i>Fusarium oxysporum</i> . sp <i>cupense</i> VCGs 01213/16 (Tropical race 4) Among Several VCGs in Race 4 on Ambon Hijau Cultivar	283
41.	Fridarti and Sri Mulyani	Changes nutrients by microbial fermentation chocolate waste indigenous result of the additional mineral phosphor and sulphur in-vitro	291
42.	Sri Hadiati and Fitriana Nasution	Clustering and genetic distance some salak species ( <i>Salacca</i> spp) based on morphological characters	295
43.	Asep Dedy Sutrisno, Yusman Taufik, and Jaka Rukmana	Optimalization Flour Composite Nutritiose as Basic Materials Processing for Food Products	303
44.	Sri Utami, Suryawati and Ermeli	KNO <sub>3</sub> Concentration and Soaking Time Effect on Breaking Seed Dormancy and Seed Growth of Sour-Sop ( <i>Annona muricata</i> L.)	310

45.	Susilawati, Dewi Sartika, and Mochamad Karel Saputra	Effect of Kepok Banana ( <i>musa paradisiaca linn</i> ) Peel Flour Addition as a Stabilizer on Chemical and Organoleptic Properties of Ice Cream	316
46.	Ubad Badrudin, Syakiroh Jazilah, and Budi Prakoso	The effect of soil submersion duration and ameliorant types on growth and yield of shallot at Brebes Regency	325
47.	Yulfi Desi, Trimurti Habazar, Ujang Khairul, and Agustian	Disease progress of Stewart's Wilt ( <i>Pantoea stewartii</i> subsp. <i>stewartii</i> ) on sweet corn	330
48.	Yusnaweti	On Growth Response And Results Of Upland Rice Due To The Allotment Of Some A Dose Of Compost Bamboo Leaves	337
49.	Fadriani Widya, Darmawan, and Adrinal	Rice husk biochar application in traditional paddy soil and its effect of nutrients vertical distribution	343
50.	Ragapadmi Purnamaningsih, Ika Roostika, and Sri Hutami	Embryogenic Callus Induction and Globular Embryo Formation of Kopyor Coconut ( <i>Cocos nucifera</i> L.)	350
51.	A. Sparta, L. Octriana, Nofiarli, N. Marta, Kuswandi, M. Andini, and Y. Irawati	The Role of Cow Manure to Reduce The Need of Nutrient N Inorganic In Banana Plant Vegetative Growth	357
52.	Wijaya Edo Rantou	Analysis Influence of Technical Competence on Company's Performance In Electrical Engineering Company In Bandung	362
53.	Desi Ardilla, Herla Rusmarilin, and Adi Purnama	Study The Physical And Chemical Properties Of Bioethanol From Pineapple Skin ( <i>Ananas comusus</i> L.Merr )	370
54.	Masyhura MD, Budi Suarti, and Evan Ardyanto AS	Increase Moringa Leaf Powder and Long Roasting on Protein Content in the Making of Cookies from Mocaf ( <i>Modified Cassava Flour</i> )	376
<b>MEDICINES, PUBLIC HEALTH, ENGINEERING, AND NATURAL SCIENCES</b>			
55.	Ayulia Fardila Sari ZA, Putri Nilam Sari, and Muthia Sari	Implementation of Hospital Information System in RSUP Dr. M. Djamil Padang 2016	381
56.	Dien GA Nursal, Rizanda Machmud, Eryati Darwin, Nana Mulyana	Implementation Patient Safety Standards in Basic Emergency Obstetric Care Community Health Center (BEOC_CHC) Padang	389

57.	Dewi Sartika, Susilawati, and Mumpuni Uji Kawedar	Survey of Salmonella Contaminated Vannamei Shrimps in Lampung	396
58.	Ferra Yanuar	Determinants of Birth Weight at Various Quantiles in West Sumatra	403
59.	Hardany Primarizky, Ira Sari Yudaniayanti, and Djoko Galijono	Detection Of Osteoporosis in Ovariohysterectomized Cats ( <i>Felis Domesticus</i> ) based on Serum Osteocalcin Levels	408
60.	Nefilinda	Influence of Education and Local Wisdom on Environment Villages in Minangkabau	413
61.	Masri, E., Asmira,S and Verawati	Local Food Development from Combination <i>Siarang</i> Variety Of Black Rice ( <i>Oryza Sativa L.Indica</i> ) And Yellow Pumpkin ( <i>Cucurbita Moschata</i> ) To Prevent Anemia For Pregnant Women	420
62.	Suryani, Zulmardi, Abdi Dharma, Yunazar Manjang, and Febria Elvy Susanti	Development of Antimicrobial Analysis of Lactic Acid Bacteria Isolated from VCO (Virgin Coconut Oil) Fermentation Process Against Bacteria in The Secretion of CSOM	425
63.	Suci Rahayu, Darmawan Saptadi, and Febi Reza Fitriani	The Influence of Dicamba in Combination with BAP on Callus Induction and Proliferation of Centella ( <i>Centella asiatica</i> L.)	432
64.	Christina J. R. E. Lumbantobing, Endang Purwati, Sumaryati Syukur, and Eti Yerizel	Triglyceride lowering effect of <i>Garcinia atroviridis</i> leaf tea from Sijunjung - West Sumatra on obese subjects in Medan, North Sumatra	440
65.	Netty Suharti	Preparation and Characterization of Ethanol Extract of Mychorryzae Induced Ginger as Raw Matherial for Anti Breast cancer Nano suspension Formulation	449
<b>ECONOMY AND SOCIAL SCIENCES</b>			
66.	Ike Revitaa, R. Trioclariseb, Inesti Printa Elisyac	Reflections Of Social Reality In The Activities Of Women Trafficking In West Sumatera	454
67.	Andri, Ida Indrayani and Rahmi Wati	Technical Efficiency Analysis of Poultry in District of 50 Kota (Stochastic Frontier Production Function Approach)	460

68.	Arif Fadhillah	Teaching Accounting in Business School: A Personal Reflection	465
69.	Wijaya Edo Rantou	Analysis Influence of Technical Competence on Company's Performance In Electrical Engineering Company In Bandung	470
70.	Ira Apriyanti, Desi Novita, and Pandhu Ahmad Pangestu	Efficiency of Marketing Distribution of Palm Oil in Sub District of Selesai Regency of Langkat	477
71.	Yeyep Natrio, Afdhal Rinsik, Gusmaizal Syandri	The Occurance Of Transitivity And Suicidal Motives On Famous Public Figure`S Suicide Letters	483
72.	Yusmarnia and Mahdi	An analysis of Marketing Efficiency of Sapodilla in Nagari Sumpur sub district of Tanah Datar, West Sumatera	494
73.	Jusuf Wahyudi, Hesti Nur'aini and Lina Widawati	Information Systems of Eradication Pests and Diseases Crops for Agriculture Extension Instructor	501
74.	Desi Novita and Ira Apriyanti	The Regional Investment Competitiveness In Binjai City	506
75.	Khairunnisa Rangkuti, Desi Novita, and Bima Mahdi	The Impact of Rising Soybean Prices to Tofu Industry Small Scale in Medan	511

# Determinants of Birth Weight At Various Quantiles in West Sumatera

Ferra Yanuar

Department of Mathematics, Faculty of Mathematics and Natural Sciences,  
Andalas University, Kampus Limau Manis, 25163, Padang – Indonesia  
Corresponding Author: ferrayanuar@yahoo.co.id

## Abstract

Covariates could affect the responses differently at various points of the response distribution. Many covariates might have higher impact on conditional mean of the response than on conditional 10th percentile, for example. These effect can be analyzed directly by using quantile regression. This paper aims to implement the use of quantile regression to identify the determinants of birth weight at various quantiles. A cross-sectional study was conducted in March to June 2016 by distributing the questionnaires to mother who gave birth at any selected hospital in West Sumatera. This research proves that determinants of birth weight at low quantile are education level, problems during pregnancy and prenatal care. Meanwhile parity, pregnancy spacing, problems during pregnancy and gender are associated with higher birth weights. All proposed model could be accepted based on goodness of fit test.

Keywords: quantile regression, cross-sectional study, birth weight.

## 1. Introduction

Birth weight has served as leading indicator of infant health, with low birth weight infants classified as those weighing less than 2500 grams at birth. Obsevable measures of mother weight gain, education level, problems while pregnant, age, parity, prenatal care, mother weight gain, hemoglobin (Hb) and spacing pregnancies (Abrevaya & Dahl, 2008; Burgette & Reiter, 2012) were assumed had strong associations with birth weight. For instance, according to a report by Burgette & Reiter (2012), mothers who had problems during pregnancy would have babies with birth weight less than 2500 grams.

Many researches have examined that the low birth weight will cause many problems. Abrevaya in his article wrote that the infant

mortality rate increases at lower birth weights. The direct medical costs for babies with low birth weight are quite high as well. The babies with low birth weight have the long term effects on their cognitive development, educational outcomes and labor market outcomes. The babies would have development problems in cognition, attention and neuromotor functioning that persist until adolescence. The babies with low birth weight are more likely to attend special class, delay entry into kindergarden or repeat a grade in school. Those babies are also more likely to have inferior labor-market outcomes, being more likely to be unemployed and earn lower wages.

Although it has received less attention in the economics literature, high birthweight outcomes can also represent adverse outcomes.

For instance, babies weighing more than 4000 grams, classified as high birthweight (HBW) and especially those weighing more than 4500 grams, classified as very high birthweight (VHBW) are more likely to require cesarean-section births, have higher infant mortality rates, and develop health problems later in their life (Hulman *et al.*, 2015).

A difficulty in evaluating initiatives aimed at improving birth outcomes is to accurately estimate the causal effects of prenatal activities on these birth outcomes. Unobserved heterogeneity among childbearing women makes it difficult to isolate causal effects of various determinants of birth outcomes. Whether or not a mother's age affect the infant weight, for instance, is likely to be correlated with unobserved characteristics of the mother. To deal with this difficulty, various studies have used an instrumental-variable approach to estimate the effects of prenatal care on birth outcomes.

Another approach has been to utilize panel data (i.e., several births for each mother) to identify these effects from changes in prenatal behavior or maternal characteristics between pregnancies (Wei & Carroll (2008). One concern with the panel-data identification strategy is the presence of "feedback effects," specifically that prenatal care and mother's habits in later pregnancies may be correlated with birth outcomes in earlier pregnancies. Wei *et al.*(2015) provides an explicit estimation strategy to deal with such feedback effects (using data on at least three births per mother). Since the costs associated with birthweight have been found to exist primarily at the low end of the birthweight distribution (with costs increasing significantly at the very low end), any studies have estimated the effects of birth inputs on the fraction of births below various intervals. This present study consider a quantile regression approach to estimate the effects of birth inputs on birthweight. Quantile approach provides a method for determining how birth inputs affect birthweight at different parts of the distribution (Wang *et al.*, 2009). The birth inputs involved in this study are 8 indicators consists of continuous and categorical types, they are education level,

problems while pregnant, age, parity, prenatal care, mother weight gain, hemoglobin (Hb) and spacing pregnancies (Abrevaya & Dahl, 2008; Burgette & Reiter, 2012; Feng & Zhu, 2016).

There are any advantages using quantiles regression then analysis of variance or classical regression. Any reasons why we better use quantile regression are :

- Analysis of variance (ANOVA) and regression provide information only about the conditional mean.
- More knowledge about the distribution of the statistic may be important.
- The distribution of , the dependent variable, conditional on covariate X, may have thick tails.
- The conditional distribution of Y may be asymmetric.
- The conditional distribution of Y may not be unimodal.
- Neither regression nor ANOVA (analysis of variance) will give the robust results, especially if the outlier exist inside the data.

## 2. Material and Methods

In this present study, we used primary data collected by distributing the questionnaires to mother who just have baby, live, single and stay in West Sumatera. The questionnaires were distributed from March to July 2016. There are 93 respondents with complete information that involved in this study.

The response variable is birth weight, recorded in kilograms. Meanwhile the birth inputs are assumed affected by eight indicators consists of continuous and categorical types. There are education level, problems while pregnant, age, parity, prenatal care, mother weight gain, hemoglobin (Hb) and spacing pregnancies. The following Table 1 presents the summary statistics of Birthweight data.

Table 1. Descriptive of Birth Weight Data

Mean		3,063
Median		3,100
Mode		3,2
Skewness		-0,592
Kurtosis		0,578
Minimum		1,1
Maximum		4,5
Percentiles	25	2,700
	50	3,100
	75	3,500

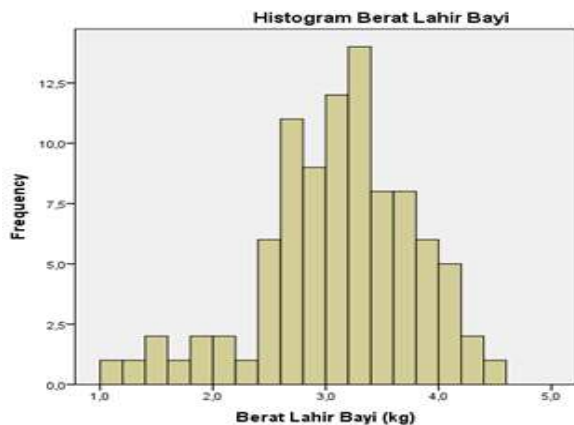
Based on the description in Table 1 we are informed that the mean of birthweight data is 3,063. The highest value of the data is 4,5 and the lowest value is 1,1. We also see that the distribution of the data is skewed to the left since its skewness is - 0.592, as presented in Figure 1.(a).

For construction of Birthweight model, this present study apply the quantile regression approach, since we purpose to identify the Birthweight model for any quantiles (low quantile, middle quantile and high quantile). The

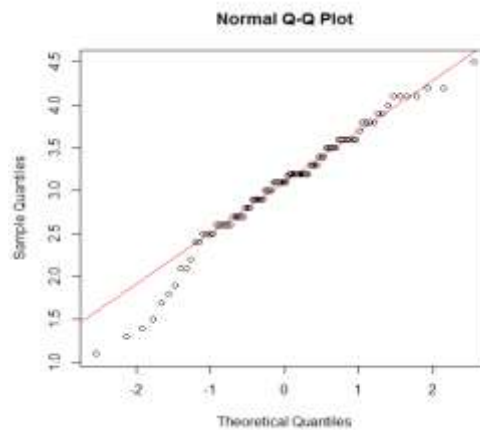
following is the general explanation regard quantile procedure used in this research.

As described by Davino *et al.* (2014), quantile is defined as the value that corresponds to a specified proportion of a sample or population. Thus, we may defined  $\tau$  th quantile as the value which divide the data into two parts, the  $\tau$  fraction of the data below it and  $1-\tau$  fraction of the data above it, and  $0 < \tau < 1$ . Median is a very commonly used quantile, which is aqual to a proportion of 0.5 is the ordered data. Regression analysis is used to quantify the relationship between a response variable and one or several of free covariates (Yanuar, 2014).

Quantiles regression is a statistical method used to estimate models for conditional quantile functions. Unlike the classical linear regression methods that are based on minimizing sums of squared residuals and to estimate models for conditional mean functions, quantile regression methods are based on minimizing absolute residuals, and intended to estimate conditional median functions and a full range of other conditional quantile functions. Quantile regression also provides a more complete graph of the conditional distribution of variable of interest  $Y$  given  $X=x$ .



(a)



(b)

Figure 1.(a) Histogram of Birthweight data.  
 (b) Empirical quantile plot and Normal plot of Birthweight data.

For a random sample  $\{y_1, \dots, y_n\}$ , the classical linear regression can be estimated by the well-known method, which minimizes the sum of squared residuals:

$$\min \sum_{i=1}^n (y_i - \hat{y}_i)^2 \quad (1)$$

For the special case of estimation the conditional median of function, we can define the solution as problem to minimization a sum of absolute residuals, where there are the same numbers of observations above and below the median, which can be calculated by:

$$\min \sum_{i=1}^n |y_i - \hat{y}_i| \quad (2)$$

Analogous to the concept of median, Davino *et al* (2014) proposed a complete and different method for estimation of an unknown value, say  $a$ , for any  $\tau$  in the interval  $(0,1)$ , which may be defined as any solution to the minimization problem of the equation:

$$\min_{a \in \mathbb{R}} \left\{ \sum_{i=1}^n \tau |y_i - a| + \sum_{i=1}^n (1-\tau) |y_i - a| \right\} \quad (3)$$

$0 < \tau < 1$

Consider a classical linear regression model  $y_i = \mathbf{x}_i' \boldsymbol{\beta} + e_i$ , we defined a linear model for the  $\tau$ -th quantile as:

$$y_i = \mathbf{x}_i' \boldsymbol{\beta}_\tau + e_i \quad i = 1, \dots, n \quad (4)$$

In estimating models for conditional quantile function, we minimize a sum of asymmetrically weighted absolute residuals. This will contribute to different weights to positive and negative residuals. The general  $\tau$ -th sample quantile, which is the analogue to equation (3) can be formulated as:

$$\hat{\beta}(\tau) = \min_{\beta \in \mathbb{R}} \left\{ \sum_{i=1}^n \tau |y_i - \mathbf{x}_i' \boldsymbol{\beta}_\tau| + \sum_{i=1}^n (1-\tau) |y_i - \mathbf{x}_i' \boldsymbol{\beta}_\tau| \right\}$$

And equivalently written as:

$$\hat{\beta}(\tau) = \min_{\beta \in \mathbb{R}} \sum_{i=1}^n \rho_\tau (y_i - \mathbf{x}_i' \boldsymbol{\beta}_\tau) \quad (5)$$

$0 < \tau < 1$

Several software packages can be used to implement the quantile regression method, such as S-plus, R-program and Stata. In this research, R software was used to analyze data of the Birthweight.

### 3. Result And Discussion

In this analysis, quantile regression approach is used to examine the relationships between the Birthweight and some potential explanatory variables. Table 2 provides a summary of describe the explanatory variables which are found to have a significant relationships with Birthweight for various conditional quantile function, particularly for  $\tau$  equals 0.10, 0.25, 0.50, 0.75 and 0.90. In the last column are the estimated of ordinary least square approach and its corresponding standard errors in the brackets.

Table 2 informs us that mother with middle or high education level tent to have havier baby than mother with low education level. Mother with more parities tent to have havier baby than less parities. Mother with longer space of pregnancies tent to have baby. The heavier of mother's weight gain the heavier of birthweight of her baby. The higher of mother's hemoglobin, the heavier of her baby's birthweight. Thus this study found that significant variables which effect the baby's birthweight are education level, parity, spacing pregnancies, mother's weight gain and mother's hemoglobin.

Table 3 presents the goodness of fit for all model, indicated by *PseudoR*<sup>2</sup> value. Based on the result of this study, it proved that all model at any selected quantiles are acceptable since all *PseudoR*<sup>2</sup> values more than 0.7 (Feng *et al.*, 2011; He & Zhu, 2011). The best model is at middle quantile (*PseudoR*<sup>2</sup> equals 0.910).



Table 2. Coefficient Estimated for Birth Weight Model Using Quantile Regression (QR) and OLS

Indicator Variable	Estimate of QR (Standard Error)					Estimate of OLS (Standard Error)
	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.90$	
$\beta_2$ (Middle)	0.700 (0.224)**	0.501 (0.243)**	0.378 (0.173)**	0.421 (0.262)	0.203 (0.228)	0.364 (0.174)**
$\beta_3$ (High)	0.662 (0.345)**	0.433 (0.258)*	0.378 (0.184)**	0.613 (0.279)**	0.149 (0.243)	0.420 (0.178)**
$\beta_4$ (Parity)	0.331 (0.137)**	0.235 (0.102)**	0.106 (0.073)	0.216 (0.111)**	0.279 (0.096)**	0.242 (0.073)**
$\beta_5$ (Spacing pregnancies)	-0.089 (0.057)	-0.070 (0.042)*	0.014 (0.030)	-0.039 (0.046)	-0.074 (0.040)	-0.052 (0.030)*
$\beta_6$ (Weight gain)	0.038 (0.025)	0.023 (0.019)	0.033 (0.013)**	0.006 (0.020)	0.015 (0.017)	0.021 (0.013)
$\beta_9$ (Hb)	0.108 (0.099)	0.130 (0.074)*	0.097 (0.052)*	0.062 (0.080)	0.126 (0.069)*	0.077 (0.053)

\* Significant at 10% level  
 \*\*Significant at 5% level

Table 3. *PseudoR*<sup>2</sup> for Selected Quantile for Low Birth weight Cases

Quantiles	<i>PseudoR</i> <sup>2</sup>
0.10	0.736
0.25	0.877
0.50	0.910
0.75	0.909
0.90	0.856

**References**

[1] Abrevaya J. and Dahl MC. 2008. The Effect of Birth Inputs on Birth weight: Evidence from Quantile Estimation on Panel Data. *Journal of Business & Economic Statistics*, **26**, 379 – 397

[2] Burgette LF. and Reiter JP. 2012. Modeling Adverse Birth Outcomes via Confirmatory Factor Quantile Regression. *Biometrics* **68**, 92 – 100

[3] Davino C, Furno M, and Vistocco D. 2014. *Quantile Regression: Theory and Applications*. John Wiley & Sons, Ltd.

[4] Feng X and Zhu L. 2016. Estimation and Testing of Varying Coefficients in Quantile Regression. *Journal of the American Statistical Association* **111**, 266 – 274.

[5] Feng, X., He, X., and Hu, J. 2011. Wild Bootstrap for Quantile Regression. *Biometrika*, **98**, 995–999.

[6] He X. and Zhu LX. 2011. A lack of fit test for quantile regression. *Journal of the American Statistical Association*, **98** (464) : 1013 - 1022

[7] Hulman A., et. Al. 2015. Heterogeneous Effect Of Gestational Weight Gain On Birth Weight: Quantile Regression Analysis From A Population-Based Screening. *Annals Of Epidemiology*, **25**: 133 – 137

[8] Wang, H., Zhu, Z., and Zhou, J. 2009. Quantile Regression in Partially Linear varying Coefficient Models. *The Annals of Statistics*, **37**, 3841–3866.

[9] Wei Y and Carroll RJ. 2008. Quantile Regression With Measurement Error. *Journal of the American Statistical Association*, **104**: 1129 - 1143

[10] Wei, L., Wang, D. and Hutson, AD. 2015. An investigation of quantile function estimators relative to quantile confidence interval coverage. *Communication Statistics Theory Methods*, **44** (10): 2107 – 2135.

[11] Yanuar F. 2014. The Estimation Process in Bayesian Structural Equation Modeling Approach. *Journal of Physics : Conference Series*, **495**, 012047.