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LAMPIRAN

Lampiran 1. Data Variabel Respon, Jumlah Kematian Ibu dan Bayi di Puskesmas Kota Makassar Provinsi Sulawesi Selatan Tahun 2017

No.	Kecamatan	Puskesmas	Jumlah Kematian	
			Ibu (Y_1)	Bayi (Y_2)
1.	Ujung Tanah	Pattingalloang	0	2
2.		Tabaringan	0	2
3.		P. Barrang Lompo	0	0
4.		P. Kodingareng	0	0
5.	Tallo	Jumpandang Baru	0	1
6.		Rappokalling	0	0
7.		Kaluku Bodoa	0	1
8.	Bontoala	Layang	2	0
9.		Malimongan Baru	0	0
10.	Wajo	Tarakan	0	0
11.		Andalas	1	0
12.	Ujung Pandang	Makkasau	0	1
13.	Makassar	Bara-baraya	0	1
14.		Maccini Sawah	1	0
15.		Maradekaya	0	3
16.	Mamajang	Mamajang	0	2
17.		Cendrawasih	0	0
18.	Mariso	Dahlia	0	2
19.		Pertiwi	1	0
20.		Panambungan	0	0
21.	Tamalate	Tamalate	0	0
22.		Jongaya	0	1
23.		Barombong	0	0
24.		Maccini Sombala	0	1
25.	Rappocini	Kassi-kassi	0	1
		Mangasa	0	1
		Minasa Upa	0	0
		Ballaparang	0	0

Lampiran 2. Data Variabel Respon, Jumlah Kematian Ibu dan Bayi di Puskesmas Kota Makassar Provinsi Sulawesi Selatan Tahun 2017 (Lanjutan)

No.	Kecamatan	Puskesmas	Jumlah Kematian	
			Ibu (Y_1)	Bayi (Y_2)
29.	Panakkukang	Batua	0	3
30		Toddopuli	0	0
31.		Pampang	0	1
32.		Tamamaung	0	0
33.	Biringkanaya	Karuwisi	0	2
39.		Bulurokeng	0	1
40.		Sudiang Raya	0	1
41.		Paccerakkang	0	2
42.	Tamalanrea	Tamalanrea	0	0
43.		Tamalanrea Jaya	0	1
44.		Bira	0	2
45.		Antara	0	1
46.		Kapasa	0	0

Lampiran 3. Data Variabel Prediktor, Faktor-faktor yang Mempengaruhi Jumlah Kematian Ibu dan Bayi dalam Persen (%)

No.	Puskesmas	Program K4 (X_1)	Yankes Ibu Nifas (X_2)	Komplikasi Kebidanan (X_3)	KB Aktif (X_4)	Yankes Bayi (X_5)
1.	Pattingalloang	93,75	92,24	96,25	69,01	94,78
2.	Tabaringan	85,96	85,25	95,89	68,79	96,23
3.	P. Barrang Lompo	96,30	97,71	100,00	70,17	98,83
4.	P. Kodingareng	97,87	100,00	95,74	68,40	97,67
5.	Jumpandang Baru	95,58	94,75	97,89	60,84	96,06
6.	Rappokalling	94,85	96,85	96,93	67,94	96,62
7.	Kaluku Bodoa	96,45	93,49	97,20	72,03	100,00
8.	Layang	96,05	94,69	97,12	66,52	95,99
9.	Malimongan Baru	100,00	93,53	96,74	70,41	95,69
10.	Tarakan	96,37	86,45	97,36	71,26	96,74
11.	Andalas	92,56	91,22	97,09	71,84	96,09
12.	Makkasau	98,05	97,84	96,63	66,00	95,91
13.	Bara-baraya	90,90	95,92	97,53	73,32	96,14
14.	Maccini Sawah	95,29	96,43	98,50	64,44	96,47
15.	Maradekaya	95,93	97,27	96,15	72,42	99,25
16.	Mamajang	95,25	99,18	96, 20	73,25	96,08
17.	Cendrawasih	95,30	99,57	96,57	72,85	96,92
18.	Dahlia	99,01	98,93	97,53	72,84	97,28
19.	Pertiwi	95,11	97,02	97,70	62,94	94,64
20.	Panambungan	93,81	96,70	96,43	74,18	96,86
21.	Tamalate	94,97	99,61	96,73	41,36	96,77
22.	Jongaya	95,01	98,68	97,62	71,33	96,13
23.	Barombong	95,74	99,55	96,90	71,92	96,15
24.	Maccini Sombala	95,31	100,00	97,58	69,04	95,83
25.	Kassi-kassi	94,97	100,00	100,00	80,54	100,00
26.	Mangasa	90,40	92,37	93,13	64,29	95,66
27.	Minasa Upa	94,66	96,99	100,00	67,50	96,09
28.	Ballaparang	97,24	97,65	96,55	68,40	96,36

Lampiran 4. Data Variabel Prediktor, Faktor-faktor yang Mempengaruhi Jumlah Kematian Ibu dan Bayi dalam Persen (%) (Lanjutan)

No.	Puskesmas	Program K4 (X_1)	Yankes Ibu Nifas (X_2)	Komplikasi Kebidanan (X_3)	KB Aktif (X_4)	Yankes Bayi (X_5)
29.	Batua	95,43	97,05	96,89	65,57	96,48
30	Toddopuli	94,82	98,23	97,56	77,10	96,31
31.	Pampang	96,19	97,69	96,41	69,78	95,56
32.	Tamamaung	95,20	96,17	96,96	72,68	98,28
33.	Karuwisi	91,76	98,49	98,70	71,09	95,47
34.	Antang	95,09	97,63	96,52	63,79	95,65
35.	Antang Perumnas	95,92	94,18	95,92	70,53	95,78
36.	Tamangapa	100,00	96,28	100,00	70,05	96,31
37.	Bangkala	91,82	98,02	97,10	73,76	96,44
38.	Sudiang	96,18	96,34	98,97	68,20	96,15
39.	Bulurokeng	100,00	98,64	95,96	71,26	94,44
40.	Sudiang Raya	95,20	97,38	97,11	72,08	99,16
41.	Paccerakkang	95,00	99,70	97,28	76,62	93,26
42.	Tamalanrea	95,54	98,71	98,19	65,62	93,72
43.	Tamalanrea Jaya	90,75	98,28	97,50	67,08	93,41
44.	Bira	95,92	96,91	97,83	71,22	94,03
45.	Antara	83,99	89,93	96,91	72,70	94,43
46.	Kapasa	95,50	95,50	97,88	72,64	92,44

Lampiran 5. Output SPSS untuk Uji Kecocokan Distribusi Poisson

One-Sample Kolmogorov-Smirnov Test

		Kematian_Ibu	Kematian_Bayi
N		46	46
Poisson Parameter[a,b]	Mean	,13	,89
Most Extreme Differences	Absolute	,014	,046
	Positive	,014	,046
	Negative	-,014	-,037
Kolmogorov-Smirnov Z		,095	,315
Asymp. Sig. (2-tailed)		1,000	1,000

a. Test distribution is Poisson.

b. Calculated from data.

Lampiran 4. Output SPSS untuk Uji Overdispersi

Goodness of Fit[a]

	Value	df	Value/df
Deviance	27,215	40	,680
Scaled Deviance	27,215	40	
Pearson Chi-Square	55,333	40	1,383
Scaled Pearson Chi-Square	55,333	40	

Dependent Variable: Kematian_Ibu

Goodness of Fit[a]

	Value	df	Value/df
Deviance	58,663	40	1,467
Scaled Deviance	58,663	40	
Pearson Chi-Square	52,122	40	1,303
Scaled Pearson Chi-Square	52,122	40	

Dependent Variable: Kamatian_Bayi

Lampiran 5. Output SPSS untuk Uji Korelasi Pearson

Correlations

		Kematian_Ibu	Kematian_Bayi
Kematian_Ibu	Pearson Correlation	1	-,292*
	Sig. (2-tailed)		,049
	N	46	46
Kematian_Bayi	Pearson Correlation	-,292*	1
	Sig. (2-tailed)	,049	
	N	46	46

*. Correlation is significant at the 0.05 level (2-tailed).

Lampiran 6. Sintaks MATLAB untuk Estimasi Parameter

```
%% Ambil dataset
dataset  = xlsread('D:\Document\Universitas Hasanuddin
           (Statistika)\Semester 7\Skripsi\Data\Data.xlsx');
[n0,p0]  = size(dataset);
datafull = dataset(:,1:9);

%% Definisi X dan Y
Y1    = datafull(:,1);
Y2    = datafull(:,2);
X     = datafull(:,3:7);
[n,p] = size(X);

%% Matrix X baru
Xbaru   = [ones(n,1),X];
X1      = Xbaru(:,1);
phi     = datafull(:,8);
logit   = datafull(:,9);
[nb,kb] = size(Xbaru);

%% Lambda, Beta dan Gamma
B1 = inv(Xbaru'*Xbaru)*(Xbaru'*Y1);
B2 = inv(Xbaru'*Xbaru)*(Xbaru'*Y2);
GM = inv(Xbaru'*Xbaru)*(Xbaru'*logit);
LM = -0.1188406;
T0 = [LM,B1',B2',GM'];

%% Estimasi L0, B1, dan B2
iterasi1 = 0;
iterasi2 = 0;
selisih1 = 0.1;
selisih2 = 0.1;

while selisih1 >= 0.001
 while selisih2 >= 0.001
  XB1 = Xbaru*B1;
  XB2 = Xbaru*B2;
      = Xbaru*GM;
      = LM*X1;
      = exp(XB1) - L0;
      = exp(XB2) - L0;
```

```
% E-Step
  for j=1:kb
   for i=17:n
    A1(i) = L1(i)^Y1(i)/factorial(Y1(i));
    A2(i) = L2(i)^Y2(i)/factorial(Y2(i));

    % Turunan Pertama L0
      dLA1(i) = -Y1(i)*L1(i)^(Y1(i)-1)/factorial(Y1(i));
      dLA2(i) = -Y2(i)*L2(i)^(Y2(i)-1)/factorial(Y2(i));
      dLA(i)  = dLA1(i)*A2(i) + dLA2(i)*A1(i);
      dL0(i)  = dLA(i)/A1(i)/A2(i);
    % Turunan Pertama B1 dan B2
      dB1A1(i,j) = Y1(i)*Xbaru(i,j)*exp(XB1(i))*L1(i)^
                   (Y1(i)-1)/factorial(Y1(i));
      dB2A2(i,j) = Y2(i)*Xbaru(i,j)*exp(XB2(i))*L2(i)^
                   (Y2(i)-1)/factorial(Y2(i));
      dBA1(i,j)  = dB1A1(i,j)*A2(i);
      dBA2(i,j)  = dB2A2(i,j)*A1(i);
      dB1(i,j)   = dBA1(i,j)/A1(i)/A2(i)-
                   Xbaru(i,j)*exp(XB1(i));
      dB2(i,j)   = dBA2(i,j)/A1(i)/A2(i)-
                   Xbaru(i,j)*exp(XB2(i));
   end

   for ii=1:16
    L(ii)      = L0(ii) + L1(ii) + L2(ii);
    Z(ii)      = exp(XG(ii))/(exp(XG(ii))+exp(-L(ii)));
    dL00(ii)   = 1 - Z(ii);
    dBB1(ii,j) = (Z(ii)-1)*Xbaru(ii,j)*exp(XB1(ii));
    dBB2(ii,j) = (Z(ii)-1)*Xbaru(ii,j)*exp(XB2(ii));
    dGG(ii,j)  = Z(ii)*Xbaru(ii,j);
   end

   for iii=1:n
    dG(iii,j) = -Xbaru(iii,j)*exp(XG(iii))/(1+exp(XG(iii)));
   end

   d1L0    = 30 + sum(dL00) + sum(dL0);
   (j) = sum(dBB1(:,j)) + sum(dB1(:,j));
   (j) = sum(dBB2(:,j)) + sum(dB2(:,j));
   j)  = sum(dGG(:,j))  + sum(dG(:,j));
```

```
for k=1:kb
 for i=17:n
  A1(i)       = L1(i)^Y1(i)/factorial(Y1(i));
  A2(i)       = L2(i)^Y2(i)/factorial(Y2(i));
  XY1(i,j,k)  = Xbaru(i,j)*Xbaru(i,k)*exp(XB1(i))*
                L1(i)^(Y1(i)-1)/factorial(Y1(i));
  XY2(i,j,k)  = Xbaru(i,j)*Xbaru(i,k)*exp(XB2(i))*
                L2(i)^(Y2(i)-1)/factorial(Y2(i));

% Turunan Kedua L0^2
  d2LA1(i)  = L1(i)^(Y1(i)-2)*Y1(i)*(Y1(i)-1)/
              factorial(Y1(i));
  d2LA2(i)  = L2(i)^(Y2(i)-2)*Y2(i)*(Y2(i)-1)/
              factorial(Y2(i));
  d2LA(i)   = 2*dLA1(i)*dLA2(i) + d2LA1(i)*A2(i) +
              A1(i)*d2LA2(i);
  d2L(i)    = d2LA(i)/A1(i)/A2(i)-dLA(i)^2/A1(i)^2/A2(i)^2;

% Turunan Kedua B1^2 dan B2^2
  d2B1A1(i,j,k) = Y1(i)*XY1(i,j,k) + Y1(i)*(Y1(i)-1)*
                  XY1(i)*exp(XB1(i))/L1(i);
  d2B2A2(i,j,k) = Y2(i)*XY2(i,j,k) + Y2(i)*(Y2(i)-1)*
                  XY2(i)*exp(XB2(i))/L2(i);
  d2BA1(i,j,k)  = d2B1A1(i,j,k)*A2(i);
  d2BA2(i,j,k)  = d2B2A2(i,j,k)*A1(i);
  d2B1(i,j,k)   = d2BA1(i)/A1(i)/A2(i)-dBA1(i,j)*dBA1(i,j)*
                  Xbaru(i,k)/Xbaru(i,j)/A1(i)^2/A2(i)^2 -
                  Xbaru(i,j)*Xbaru(i,k)*exp(XB1(i));
  d2B2(i,j,k)   = d2BA2(i)/A1(i)/A2(i)-dBA2(i,j)*dBA2(i,j)*
                  Xbaru(i,k)/Xbaru(i,j)/A1(i)^2/A2(i)^2 -
                  Xbaru(i,j)*Xbaru(i,k)*exp(XB2(i));

% Turunan Kedua L0,B1 dan L0,B2
  d2LB1A1(i,j) = (1-Y1(i))*dB1A1(i,j)/L1(i);
  d2LB2A2(i,j) = (1-Y2(i))*dB2A2(i,j)/L2(i);
  d2LBA1(i,j)  = d2LB1A1(i,j)*A2(i) + dB1A1(i,j)*dLA2(i);
  d2LBA2(i,j)  = d2LB2A2(i,j)*A1(i) + dB2A2(i,j)*dLA1(i);
  d2LB1(i,j)   = d2LBA1(i,j)/A1(i)/A2(i) -
                 dLA(i)*dBA1(i,j)/A1(i)^2/A2(i)^2;
  LB2(i,j)     = d2LBA2(i,j)/A1(i)/A2(i) -
                 dLA(i)*dBA2(i,j)/A1(i)^2/A2(i)^2;
```

```
% Turunan Kedua B1,B2
  d2B12(i,j) = dBA1(i,j)*dBA2(i,j)/A1(i)^2/A2(i)^2 -
               dB1A1(i,j)*dB2A2(i,j)/A1(i)/A2(i);
 end

 for ii=1:16
  L(ii) = L0(ii) + L1(ii) + L2(ii);
  Z(ii) = exp(XG(ii))/(exp(XG(ii))+exp(-L(ii)));
  d2BB1(ii,j,k) = (Z(ii)-1)*Xbaru(ii,j)*Xbaru(ii,k)*
                  exp(XB1(ii));
  d2BB2(ii,j,k) = (Z(ii)-1)*Xbaru(ii,j)*Xbaru(ii,k)*
                  exp(XB2(ii));
 end

 for iii=1:n
  EG(iii)       = exp(XG(iii))/(1+exp(XG(iii)));
  d2G(iii,j,k) = Xbaru(iii,j)*Xbaru(iii,k)*(EG(iii)^2 -
                 EG(iii));
 end

 d2L0         = sum(d2L);
 d2L0B1(j,1)  = sum(d2LB1(:,j));
 d2L0B2(j,1)  = sum(d2LB2(:,j));
 d2B1B2(j,k)  = sum(d2B12(:,j));
 d2B1B1(j,k)  = sum(d2BB1(:,j,k)) + sum(d2B1(:,j,k));
 d2B2B2(j,k)  = sum(d2BB2(:,j,k)) + sum(d2B2(:,j,k));
 d2GG(j,k)    = sum(d2G(:,j,k));
 end
end

T  = [LM,B1',B2'];
G  = [d1L0,d1B1,d1B2];
H1 = [d2L0,d2L0B1',d2L0B2'];
H2 = [d2L0B1,d2B1B1,d2B1B2];
H3 = [d2L0B2,d2B1B2,d2B2B2];
H  = [H1',H2',H3'];

% M-Step (Newton Raphson)
     = T';
si1 = iterasi1 + 1;
     = Tlama - inv(H)*G';
ih1 = norm(Theta - Tlama);
```

```
    disp([iterasi1' Theta' Selisih1'])
    Glama    = GM;
    iterasi2 = iterasi2 + 1;
    Gamma    = Glama - inv(d2GG)*d1G';
    Selisih2 = norm(Gamma - Glama);
    disp([iterasi2' Gamma' Selisih2'])

    LM = Theta(1,:);
    B1 = Theta(2:7,:);
    B2 = Theta(8:13,:);
    GM = Gamma;

  end
end
```

Lampiran 7. Sintaks MATLAB untuk Uji Serentak Parameter Model

```
%% Uji Serentak Parameter Model
XB1 = Xbaru*B1;
XB2 = Xbaru*B2;
XG  = Xbaru*GM;

for i=1:16
  ZW(i)  = exp(GM(1,:))/(exp(GM(1,:)) + exp(-exp(B1(1,:))-
           exp(B2(1,:))));
  ZO(i)  = exp(XG(i))/(exp(XG(i)) + exp(-exp(XB1(i))-
           exp(XB2(i))));
  LW1(i) = ZW(i)*GM(1,:) + (ZW(i)-1)*(exp(B1(1,:))+
           exp(B2(1,:))) - log(1+exp(GM(1,:)));
  LO1(i) = ZO(i)*XG(i) + (ZO(i)-1)*(exp(XB1(i))+
           exp(XB2(i))) - log(1+exp(XG(i)));
end

for ii=17:n
  AW1(ii) = exp(B1(1,:))^Y1(ii)/factorial(Y1(ii));
  AW2(ii) = exp(B2(1,:))^Y2(ii)/factorial(Y2(ii));
  AO1(ii) = exp(XB1(ii))^Y1(ii)/factorial(Y1(ii));
  AO2(ii) = exp(XB2(ii))^Y2(ii)/factorial(Y2(ii));
  LW2(ii) = - exp(B1(1,:)) - exp(B2(1,:)) -
            log(1+exp(GM(1,:))) + log(AW1(ii)*AW2(ii));
  LO2(ii) = - exp(XB1(ii)) - exp(XB2(ii)) -
            log(1+exp(XG(ii))) + log(AO1(ii)*AO2(ii));
end

LW = sum(LW1) + sum(LW2);
LO = sum(LO1) + sum(LO2);
G2 = 2*(LO - LW);
```

Lampiran 8. Sintaks MATLAB untuk Uji Parsial Parameter Model

```
%% Uji Parsial Parameter Model
VB12 = -(inv(H));
VGM  = -(inv(d2GG));

% Uji Parsial Parameter Beta
for w=1:13
  SEB12(w) = sqrt(VB12(w,w));
  WB12(w)  = (Theta(w)/SEB12(w))^2;
End

% Uji Parsial Parameter Gamma
for j=1:kb
  SEGM(j) = sqrt(VGM(j,j));
  WGM(j)  = (Gamma(j,:)/SEGM(:,j))^2;
end
```

Lampiran 9. Sintaks MATLAB untuk Nilai AIC Model Regresi *Bivariate* Poisson dan BZIP

```
%% Nilai AIC Model Regresi Bivariate Poisson
XB1 = Xbaru*B1;
XB2 = Xbaru*B2;
for iii=1:n
  A1T(iii) = Y1(iii)*log(exp(XB1(iii))-LM) -
             log(factorial(Y1(iii)));
  A2T(iii) = Y2(iii)*log(exp(XB2(iii))-LM) -
             log(factorial(Y2(iii)));
  LT(iii)  = LM - exp(XB1(iii)) - exp(XB2(iii)) + A1T(iii)
             + A2T(iii);
end
AIC_BP = 2*3 - 2*(sum(LT));


%% Nilai AIC Model Regresi BZIP
XB1 = Xbaru*B1;
XB2 = Xbaru*B2;
XG  = Xbaru*GM;
for i=1:16
  ZT(i)  = exp(XG(i))/(exp(XG(i)) + exp(LM-exp(XB1(i))-
           exp(XB2(i))));
  LT1(i) = ZT(i)*XG(i) + (ZT(i)-1)*(exp(XB1(i))+exp(XB2(i))-
           LM) - log(1+exp(XG(i)));
end
for ii=17:n
  A1T(ii) = Y1(ii)*log(exp(XB1(ii))-LM) -
            log(factorial(Y1(ii)));
  A2T(ii) = Y2(ii)*log(exp(XB2(ii))-LM) -
            log(factorial(Y2(ii)));
  LT2(ii) = LM - exp(XB1(ii)) - exp(XB2(ii)) -
            log(1+exp(XG(ii))) + A1T(ii) + A2T(ii);
end
AIC_BZIP = 2*4 - 2*(sum(LT1) + sum(LT2));
```