Web Supplement for
Spatial Dependence in Regional Business Cycles: Evidence from Mexican States

Keisuke Kondo*

This supplement file provides details on data and the estimation results. This file contains five sections:

1. Data
2. Estimation Results of Markov Switching Model with Spatial Autoregressive Process (MS-SAR); Distance-Based SWM ($\eta = 4$)
3. Estimation Results of Markov Switching Model (MS)
4. Estimation Results of Markov Switching Model with First-Order Autoregressive Process (MS-AR1)
5. Estimation Results of Markov Switching Model with Spatial Autoregressive and First-Order Autoregressive Processes (MS-SAR-AR1); Distance-Based SWM ($\eta = 4$)

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1 Data

Figure 1

Figure 1 shows the seasonally adjusted Quarterly Indicator of State Economic Activity (*Indicador Trimestral de la Actividad Económica Estatal*, ITAEE) from 2003:Q1 to 2012Q1.

Figure 2

Figure 2 shows the percentage changes of ITAEE, which are calculated by $[\log(y_{t,n}) - \log(y_{t-1,n})] \times 100$.

2 Estimation Results of Markov Switching Model with Spatial Autoregressive Process (Distance-Based SWM, $\eta = 4$)

Table 1

Table 1 shows the point estimates and interval estimates of parameters.

Figure 3

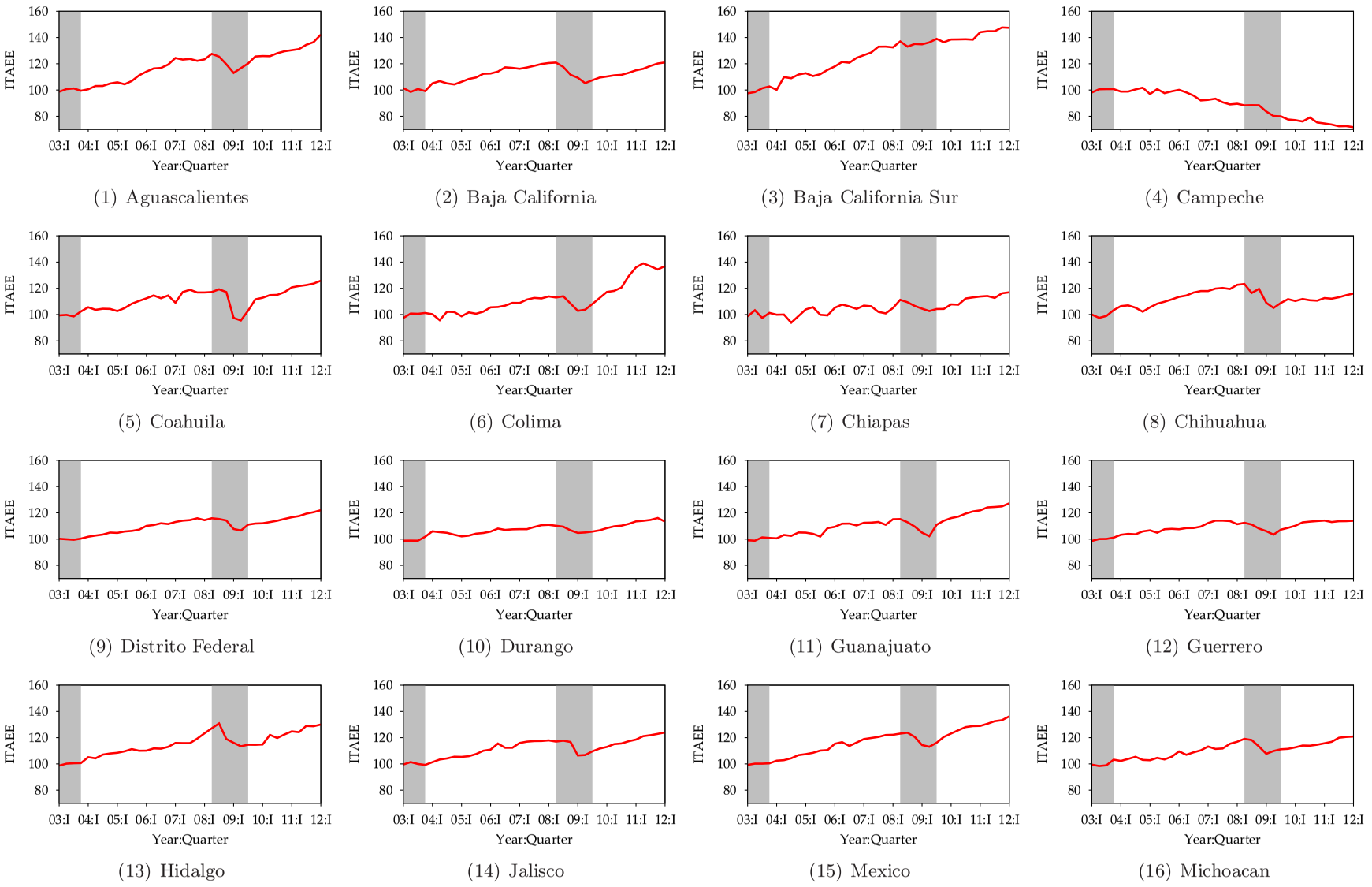
Figure 3 shows the probabilities of recession, which are calculated by $1 - G^{-1} \sum_{g=1}^{G} s_{t,n}^{(g)}$, where G is the number of iterations and the superscript (g) is the gth iteration.

Figure 4

Figure 4 shows the posterior distributions of parameters by state. The solid line indicates density estimates obtained by kernel density estimation.

Figure 5

Figure 5 shows the posterior distribution of ρ. The solid line indicates density estimates obtained by kernel density estimation.



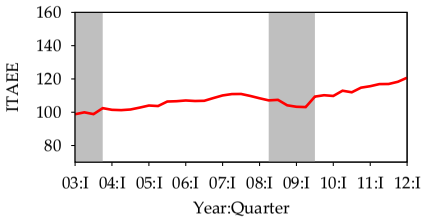
(1) Aguascalientes (2) Baja California (3) Baja California Sur (4) Campeche

(5) Coahuila (6) Colima (7) Chiapas (8) Chihuahua

(9) Distrito Federal (10) Durango (11) Guanajuato (12) Guerrero

(13) Hidalgo (14) Jalisco (15) Mexico (16) Michoacan

Figure 1: ITAEE



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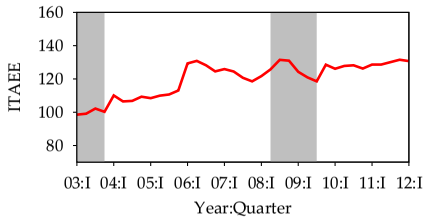
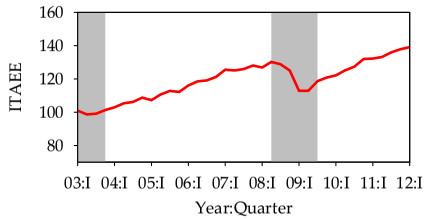
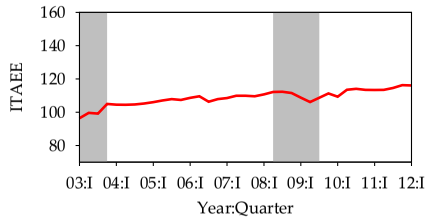


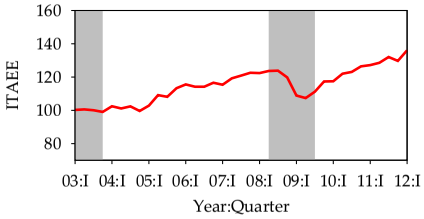
(18) Nayarit



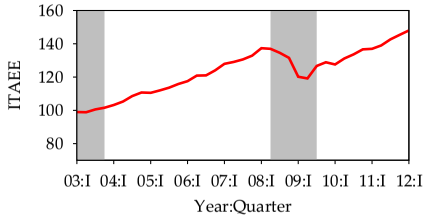
(19) Nuevo Leon



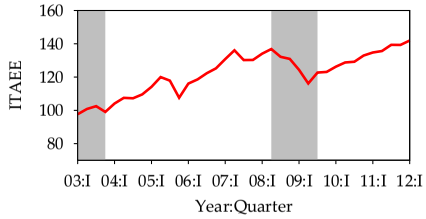
(20) Oaxaca



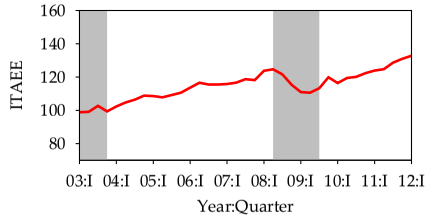
(21) Puebla



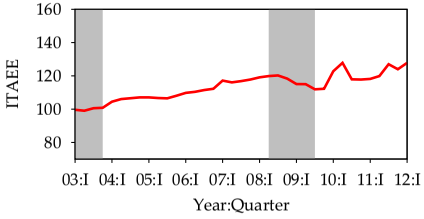
(22) Queretaro



(23) Quintana Roo



(24) San Luis Potosi



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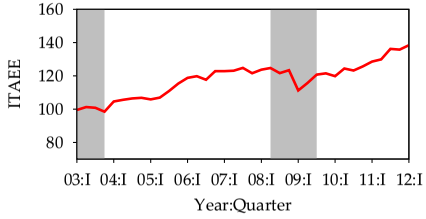
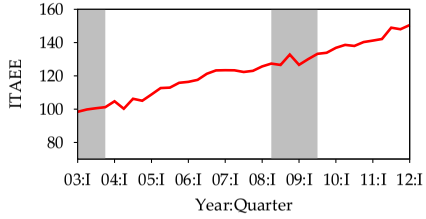


(26) Sonora



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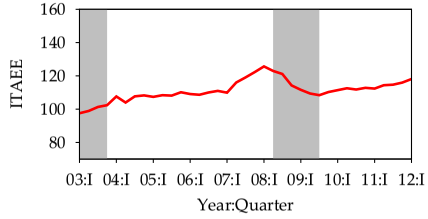
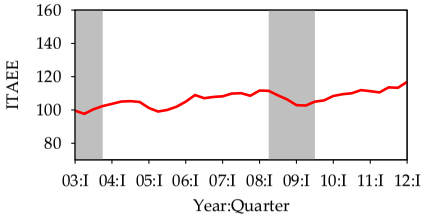


(28) Tamaulipas



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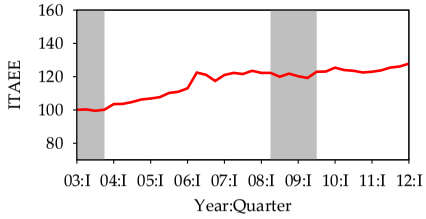
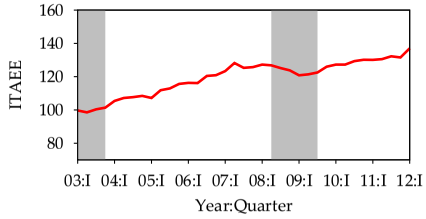
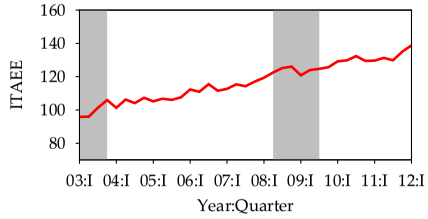


(30) Veracruz

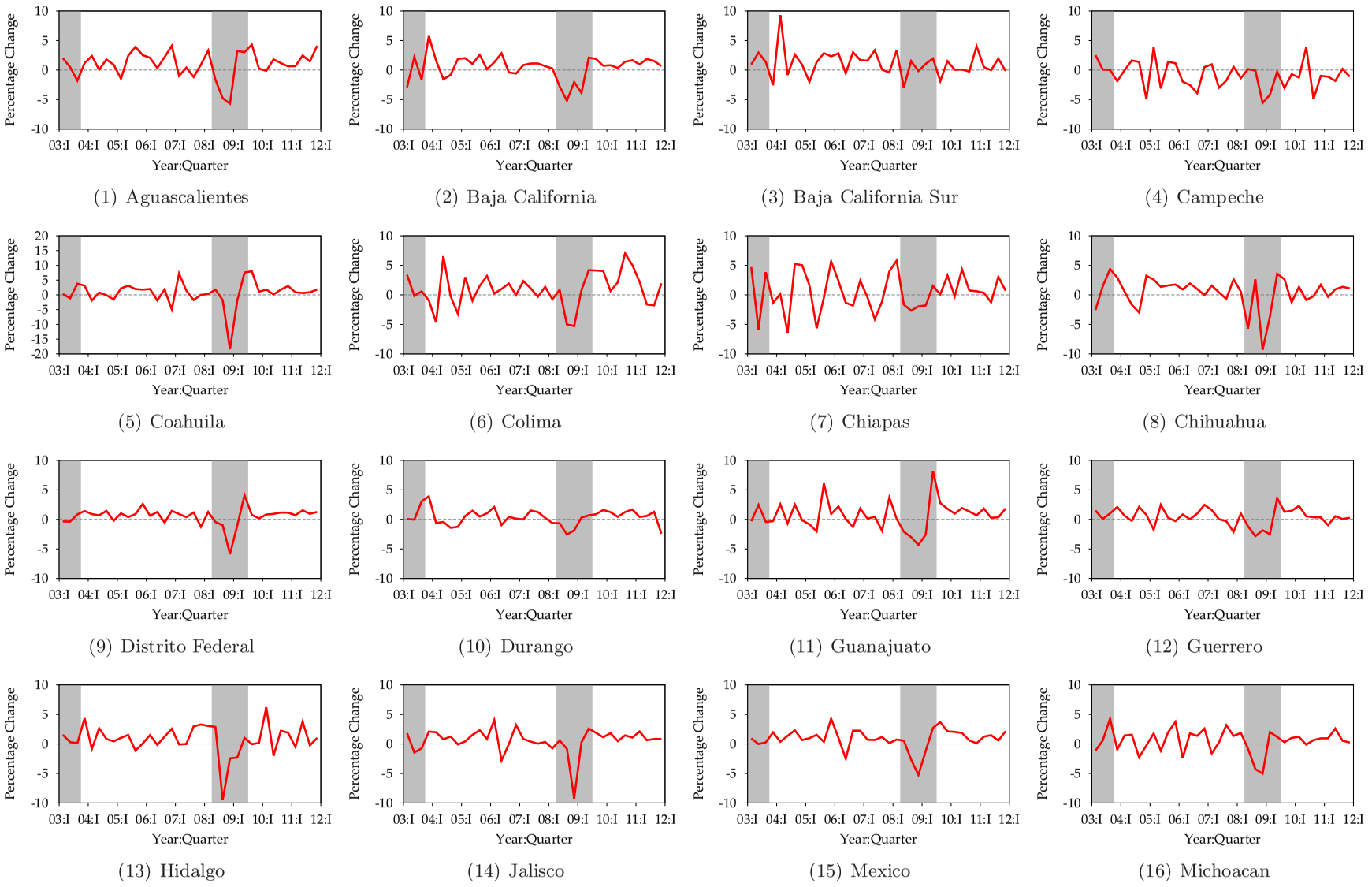


(31) Yucatan



(32) Zacatecas

Figure 1: ITAEE (Continued)



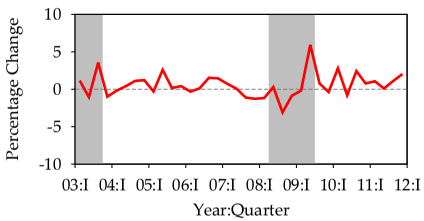
(1) Aguascalientes (2) Baja California (3) Baja California Sur (4) Campeche

(5) Coahuila (6) Colima (7) Chiapas (8) Chihuahua

(9) Distrito Federal (10) Durango (11) Guanajuato (12) Guerrero

(13) Hidalgo (14) Jalisco (15) Mexico (16) Michoacan

Figure 2: Percentage Change of ITAEE



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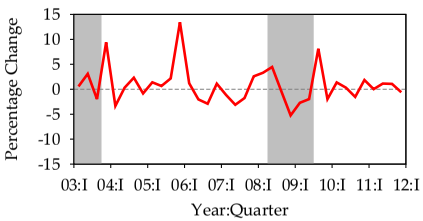
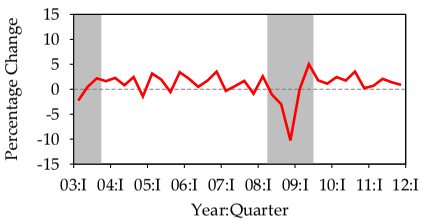
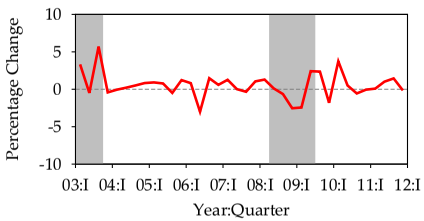


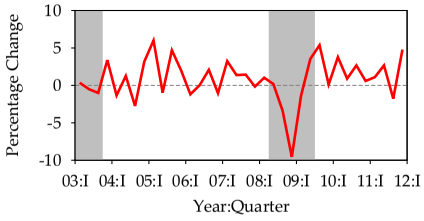
(18) Nayarit



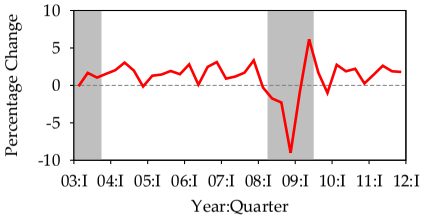
(19) Nuevo Leon



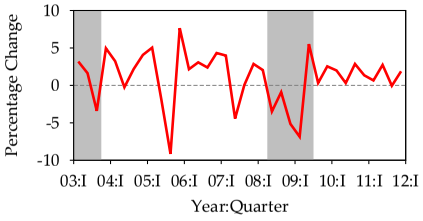
(20) Oaxaca



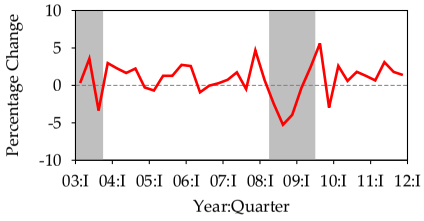
(21) Puebla



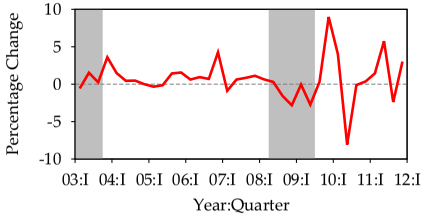
(22) Queretaro



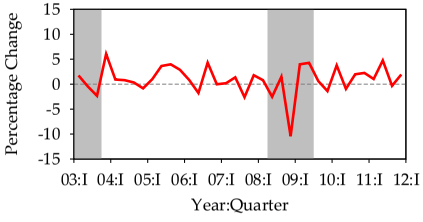
(23) Quintana Roo



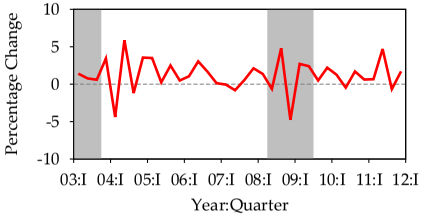
(24) San Luis Potosi



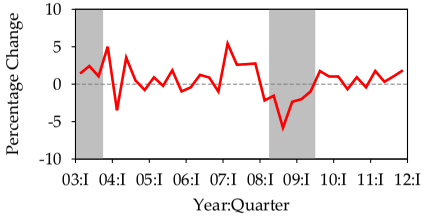
(25) Sinaloa



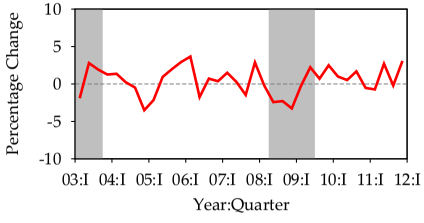
(26) Sonora



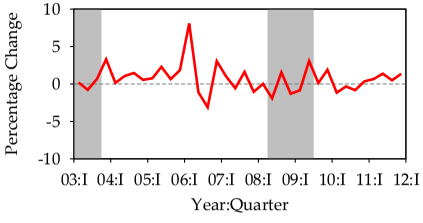
(27) Tabasco



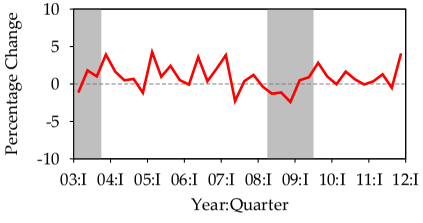
(28) Tamaulipas



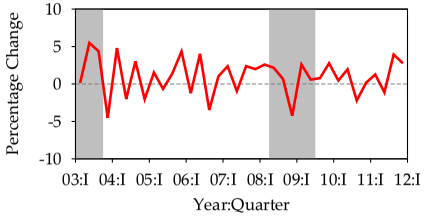
(29) Tlaxcala



(30) Veracruz



(31) Yucatan



(32) Zacatecas

Figure 2: Percentage Change of ITAEE (Continued)

Table 1: Estimated Parameters

		ρ		
		Mean	Median	95% CI
Spatial Dependence		0.28	0.28	[0.23, 0.32]

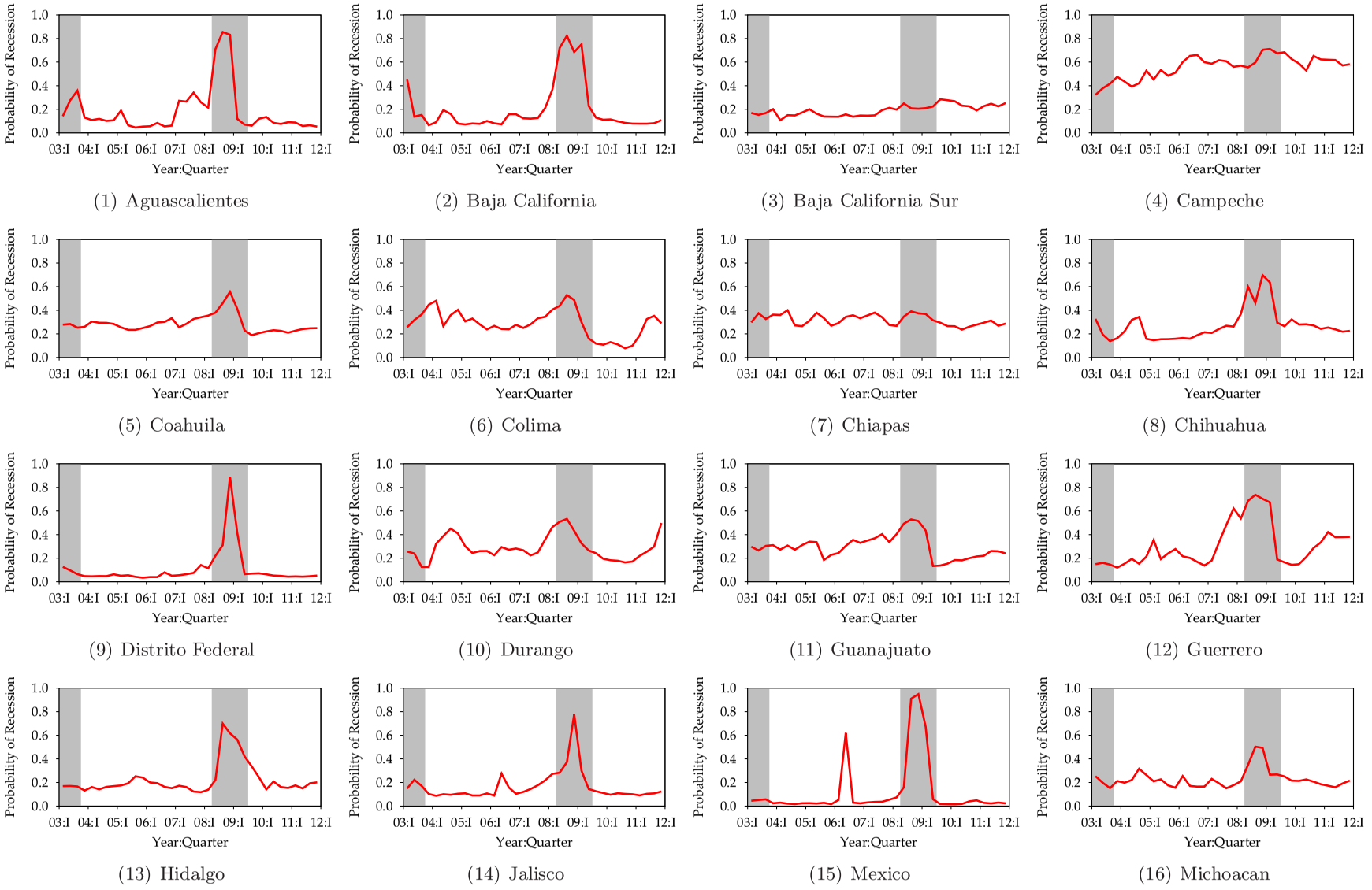
		μ_0			μ_1		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	−1.25	−1.32	[−3.12, 0.60]	1.15	1.15	[0.41, 1.91]
2	Baja California	−1.34	−1.34	[−3.08, 0.28]	0.64	0.65	[−0.06, 1.35]
3	Baja California Sur	−0.27	−0.14	[−2.19, 1.01]	1.02	1.00	[0.28, 1.85]
4	Campeche	−1.35	−1.30	[−2.47, −0.53]	−0.16	−0.31	[−1.26, 1.69]
5	Coahuila	−0.70	−0.61	[−2.53, 0.69]	0.77	0.74	[−0.31, 2.05]
6	Colima	−0.49	−0.41	[−2.20, 0.80]	1.12	1.06	[0.14, 2.42]
7	Chiapas	−0.64	−0.56	[−2.26, 0.55]	0.57	0.52	[−0.46, 1.88]
8	Chihuahua	−1.03	−0.84	[−3.34, 0.43]	0.64	0.62	[−0.22, 1.64]
9	Distrito Federal	−1.70	−1.74	[−3.77, 0.27]	0.53	0.52	[0.11, 0.97]
10	Durango	−0.61	−0.49	[−2.15, 0.30]	0.44	0.37	[−0.15, 1.57]
11	Guanajuato	−0.48	−0.37	[−2.07, 0.64]	0.76	0.69	[−0.04, 2.05]
12	Guerrero	−0.63	−0.57	[−1.94, 0.32]	0.55	0.52	[−0.02, 1.32]
13	Hidalgo	−0.87	−0.76	[−3.03, 0.68]	0.90	0.89	[0.08, 1.78]
14	Jalisco	−1.40	−1.24	[−3.95, 0.43]	0.62	0.62	[−0.01, 1.30]
15	México	−1.65	−1.78	[−3.01, 0.34]	1.03	1.04	[0.55, 1.47]
16	Michoacán	−0.68	−0.53	[−2.51, 0.48]	0.52	0.50	[−0.13, 1.35]
17	Morelos	−0.41	−0.28	[−1.97, 0.52]	0.59	0.55	[0.00, 1.43]
18	Nayarit	−0.50	−0.42	[−2.18, 0.79]	0.85	0.81	[−0.19, 2.15]
19	Nuevo León	−1.11	−1.14	[−2.92, 0.61]	1.01	1.01	[0.31, 1.70]
20	Oaxaca	−0.33	−0.17	[−2.02, 0.54]	0.64	0.53	[−0.04, 2.10]
21	Puebla	−0.70	−0.60	[−2.63, 0.77]	1.00	0.98	[0.08, 2.01]
22	Querétaro	−1.79	−1.82	[−3.30, 0.05]	1.30	1.31	[0.73, 1.85]
23	Quintana Roo	−0.79	−0.66	[−3.06, 0.95]	1.32	1.30	[0.17, 2.57]
24	San Luis Potosí	−0.93	−0.88	[−2.79, 0.61]	0.90	0.90	[0.16, 1.71]
25	Sinaloa	−0.50	−0.39	[−2.26, 0.69]	0.75	0.72	[−0.12, 1.88]
26	Sonora	−0.49	−0.38	[−2.37, 0.84]	0.94	0.91	[0.08, 1.92]
27	Tabasco	−0.25	−0.11	[−2.19, 1.09]	1.08	1.07	[0.33, 1.94]
28	Tamaulipas	−0.69	−0.59	[−2.30, 0.46]	0.81	0.75	[−0.05, 2.07]
29	Tlaxcala	−0.90	−0.78	[−2.72, 0.35]	0.55	0.52	[−0.17, 1.47]
30	Veracruz	−0.36	−0.22	[−2.08, 0.67]	0.71	0.66	[0.02, 1.73]
31	Yucatán	−0.26	−0.17	[−2.10, 1.05]	1.23	1.20	[0.61, 1.99]
32	Zacatecas	−0.34	−0.22	[−2.15, 0.90]	0.90	0.87	[0.08, 1.91]

Notes: 95% CI indicates 95% credible interval.

Table 1: Estimated Parameters (Continued)

		σ^2			p_{11}			p_{00}		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	3.15	3.00	[1.70, 5.44]	0.91	0.93	[0.73, 0.99]	0.75	0.76	[0.48, 0.95]
2	Baja California	2.94	2.83	[1.56, 5.01]	0.92	0.94	[0.76, 0.99]	0.76	0.77	[0.48, 0.95]
3	Baja California Sur	4.89	4.73	[3.14, 7.55]	0.92	0.95	[0.71, 1.00]	0.78	0.80	[0.49, 0.97]
4	Campeche	4.50	4.36	[2.74, 7.16]	0.86	0.88	[0.59, 0.99]	0.84	0.87	[0.55, 0.99]
5	Coahuila	12.62	12.19	[7.99, 19.77]	0.91	0.93	[0.67, 1.00]	0.79	0.81	[0.50, 0.97]
6	Colima	6.34	6.14	[3.74, 10.16]	0.90	0.92	[0.67, 1.00]	0.78	0.80	[0.50, 0.96]
7	Chiapas	10.21	9.89	[6.45, 15.77]	0.89	0.92	[0.64, 1.00]	0.79	0.81	[0.50, 0.97]
8	Chihuahua	5.06	4.95	[2.47, 8.28]	0.90	0.92	[0.69, 1.00]	0.77	0.79	[0.47, 0.97]
9	Distrito Federal	1.26	1.19	[0.72, 2.16]	0.94	0.95	[0.81, 0.99]	0.75	0.76	[0.46, 0.95]
10	Durango	1.67	1.62	[0.99, 2.66]	0.90	0.93	[0.66, 1.00]	0.79	0.81	[0.51, 0.97]
11	Guanajuato	3.90	3.76	[2.38, 6.22]	0.90	0.93	[0.65, 1.00]	0.79	0.81	[0.51, 0.97]
12	Guerrero	1.44	1.39	[0.81, 2.36]	0.90	0.92	[0.68, 1.00]	0.79	0.81	[0.52, 0.97]
13	Hidalgo	5.01	4.83	[2.95, 8.16]	0.91	0.94	[0.70, 1.00]	0.77	0.79	[0.49, 0.96]
14	Jalisco	2.78	2.68	[1.45, 4.68]	0.92	0.94	[0.75, 1.00]	0.75	0.77	[0.45, 0.96]
15	México	1.45	1.36	[0.79, 2.71]	0.93	0.94	[0.81, 0.99]	0.73	0.74	[0.46, 0.93]
16	Michoacán	3.02	2.93	[1.79, 4.77]	0.91	0.94	[0.69, 1.00]	0.77	0.79	[0.48, 0.97]
17	Morelos	2.14	2.07	[1.34, 3.34]	0.91	0.94	[0.68, 1.00]	0.79	0.81	[0.51, 0.97]
18	Nayarit	11.23	10.88	[7.14, 17.51]	0.90	0.93	[0.67, 1.00]	0.79	0.81	[0.51, 0.97]
19	Nuevo León	3.06	2.94	[1.69, 5.19]	0.93	0.94	[0.77, 1.00]	0.75	0.77	[0.47, 0.95]
20	Oaxaca	2.38	2.31	[1.49, 3.69]	0.90	0.93	[0.64, 1.00]	0.81	0.83	[0.53, 0.98]
21	Puebla	6.76	6.55	[4.12, 10.75]	0.92	0.94	[0.71, 1.00]	0.78	0.79	[0.50, 0.96]
22	Querétaro	2.45	2.33	[1.48, 4.09]	0.94	0.95	[0.83, 0.99]	0.77	0.78	[0.50, 0.94]
23	Quintana Roo	9.72	9.54	[4.69, 15.94]	0.91	0.93	[0.71, 1.00]	0.76	0.78	[0.48, 0.96]
24	San Luis Potosí	3.34	3.25	[1.72, 5.55]	0.91	0.93	[0.70, 1.00]	0.75	0.77	[0.48, 0.96]
25	Sinaloa	6.48	6.26	[4.06, 10.18]	0.91	0.93	[0.67, 1.00]	0.78	0.80	[0.50, 0.97]
26	Sonora	6.48	6.27	[4.05, 10.10]	0.91	0.94	[0.70, 1.00]	0.78	0.80	[0.49, 0.97]
27	Tabasco	5.56	5.38	[3.53, 8.66]	0.93	0.96	[0.71, 1.00]	0.78	0.80	[0.48, 0.97]
28	Tamaulipas	3.69	3.57	[2.16, 5.95]	0.89	0.91	[0.65, 1.00]	0.80	0.82	[0.53, 0.97]
29	Tlaxcala	2.94	2.85	[1.65, 4.80]	0.90	0.93	[0.69, 1.00]	0.76	0.78	[0.48, 0.96]
30	Veracruz	3.30	3.20	[2.08, 5.13]	0.91	0.94	[0.67, 1.00]	0.79	0.81	[0.51, 0.97]
31	Yucatán	2.44	2.36	[1.46, 3.89]	0.93	0.95	[0.73, 1.00]	0.77	0.79	[0.49, 0.96]
32	Zacatecas	5.85	5.66	[3.71, 9.11]	0.91	0.94	[0.67, 1.00]	0.78	0.80	[0.48, 0.97]

Notes: 95% CI indicates 95% credible interval.



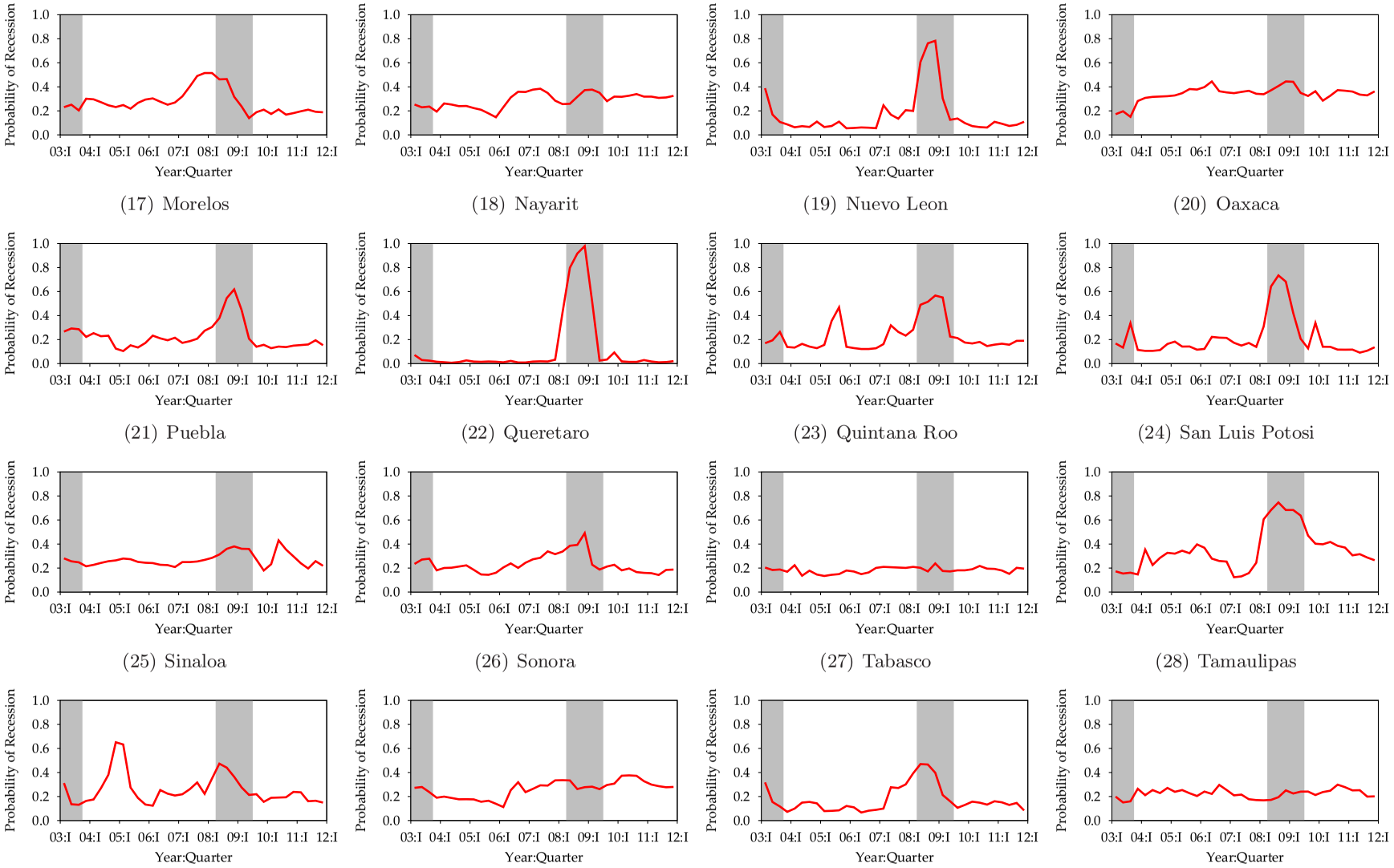
(1) Aguascalientes (2) Baja California (3) Baja California Sur (4) Campeche

(5) Coahuila (6) Colima (7) Chiapas (8) Chihuahua

(9) Distrito Federal (10) Durango (11) Guanajuato (12) Guerrero

(13) Hidalgo (14) Jalisco (15) Mexico (16) Michoacan

Figure 3: Recession Probabilities



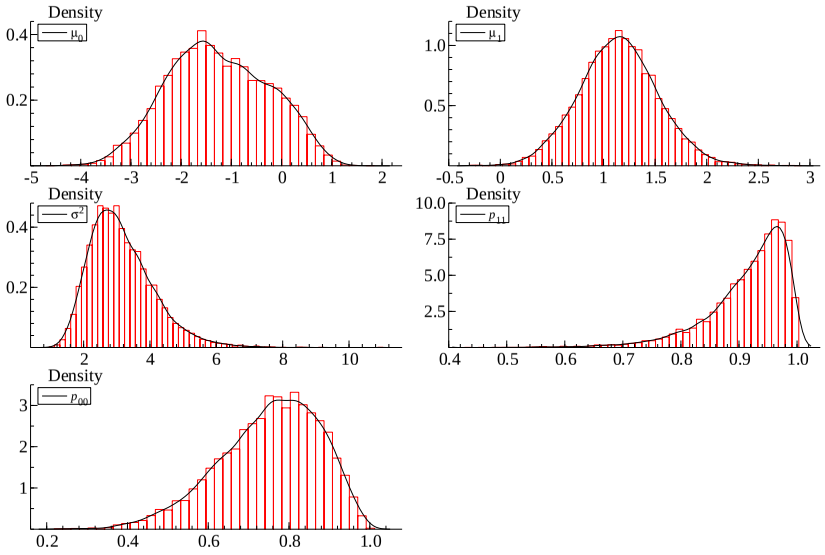
(17) Morelos (18) Nayarit (19) Nuevo Leon (20) Oaxaca

(21) Puebla (22) Queretaro (23) Quintana Roo (24) San Luis Potosi

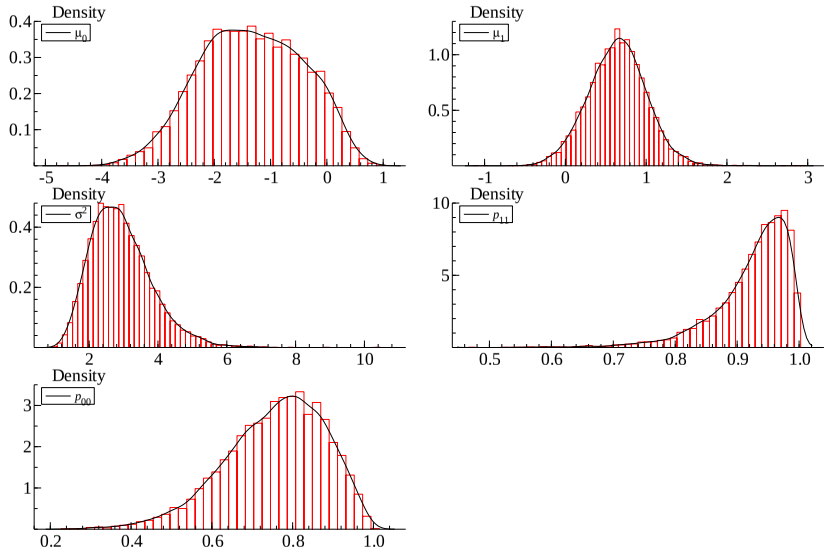
(25) Sinaloa (26) Sonora (27) Tabasco (28) Tamaulipas

(29) Tlaxcala (30) Veracruz (31) Yucatan (32) Zacatecas

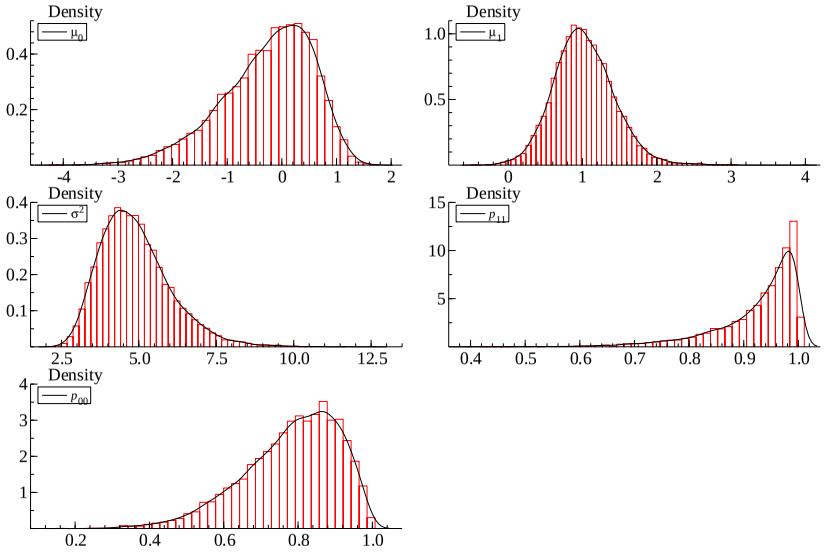
Figure 3: Recession Probabilities (Continued)



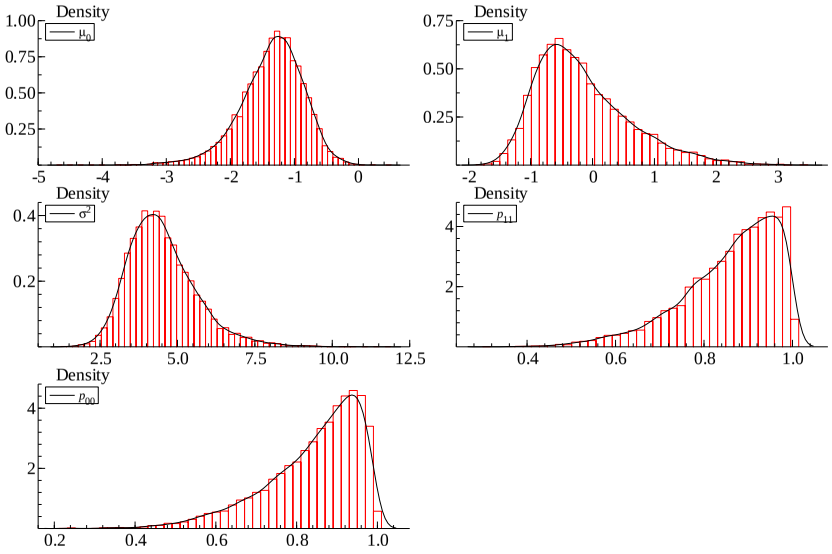
(1) Aguascalientes



(2) Baja California

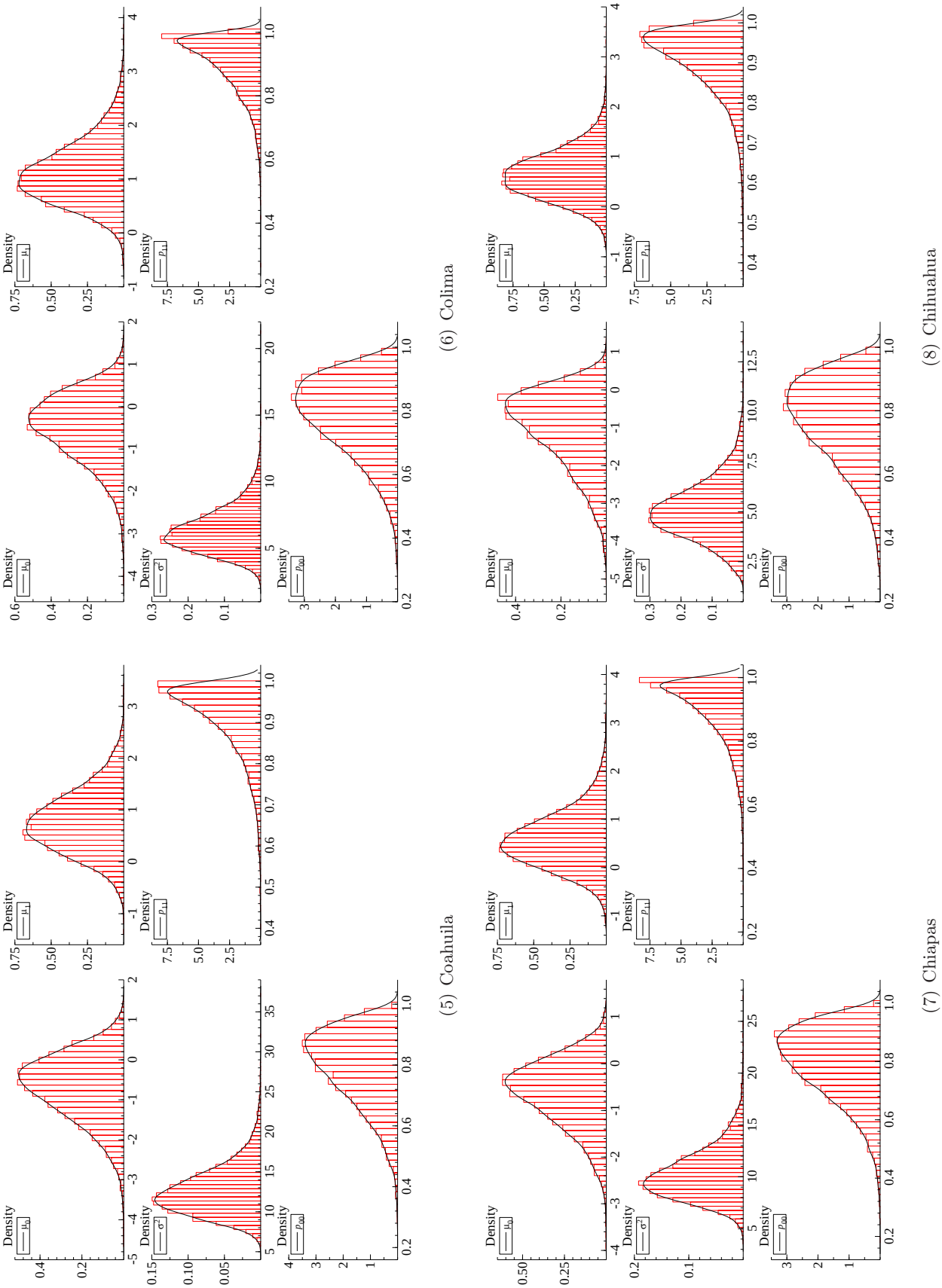


(3) Baja California Sur



(4) Campeche

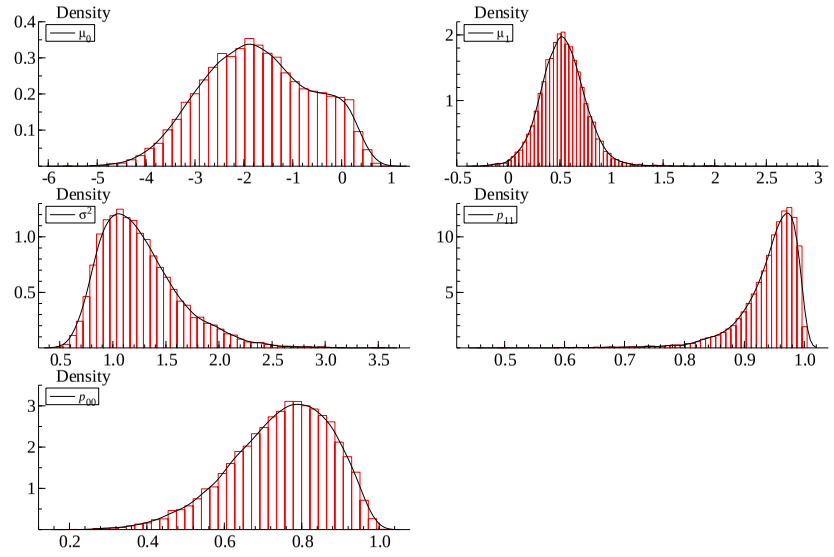
Figure 4: Posterior Distributions



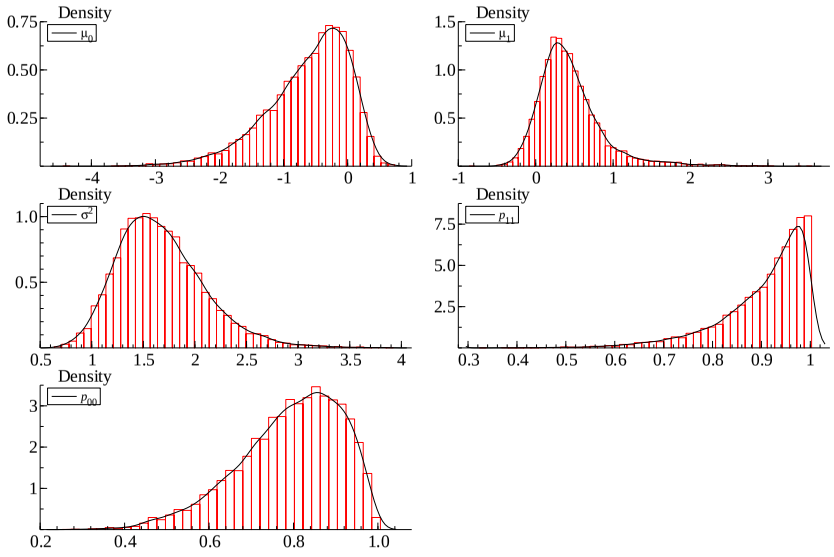
(5) Coahuila (6) Colima

(7) Chiapas (8) Chihuahua

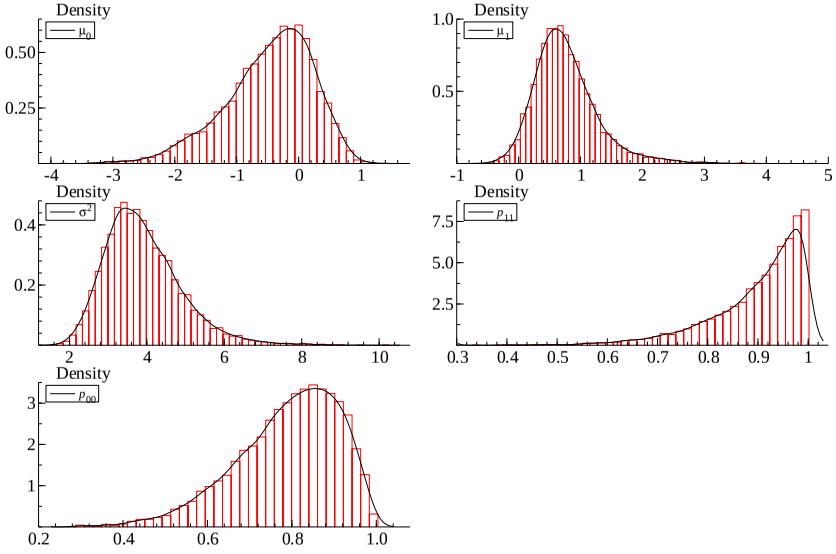
Figure 4: Posterior Distributions (Continued)



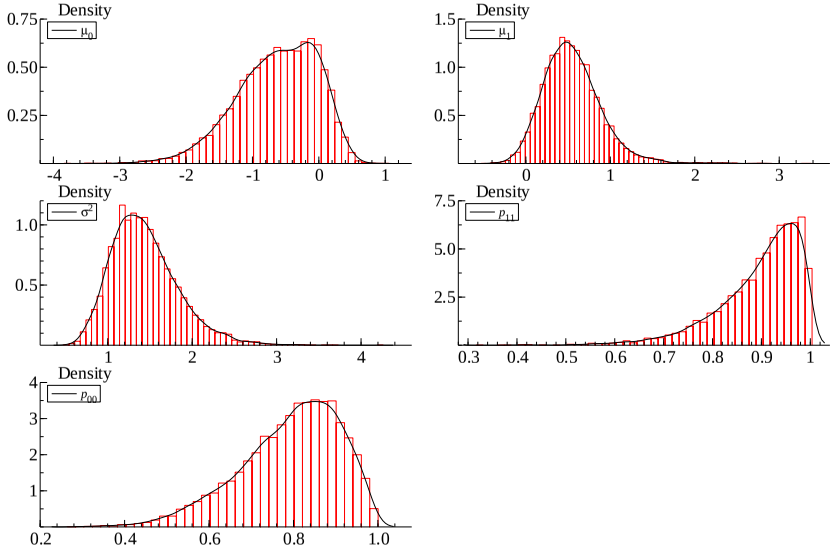
(9) Distrito Federal



(10) Durango



(11) Guanajuato



(12) Guerrero

Figure 4: Posterior Distributions (Continued)

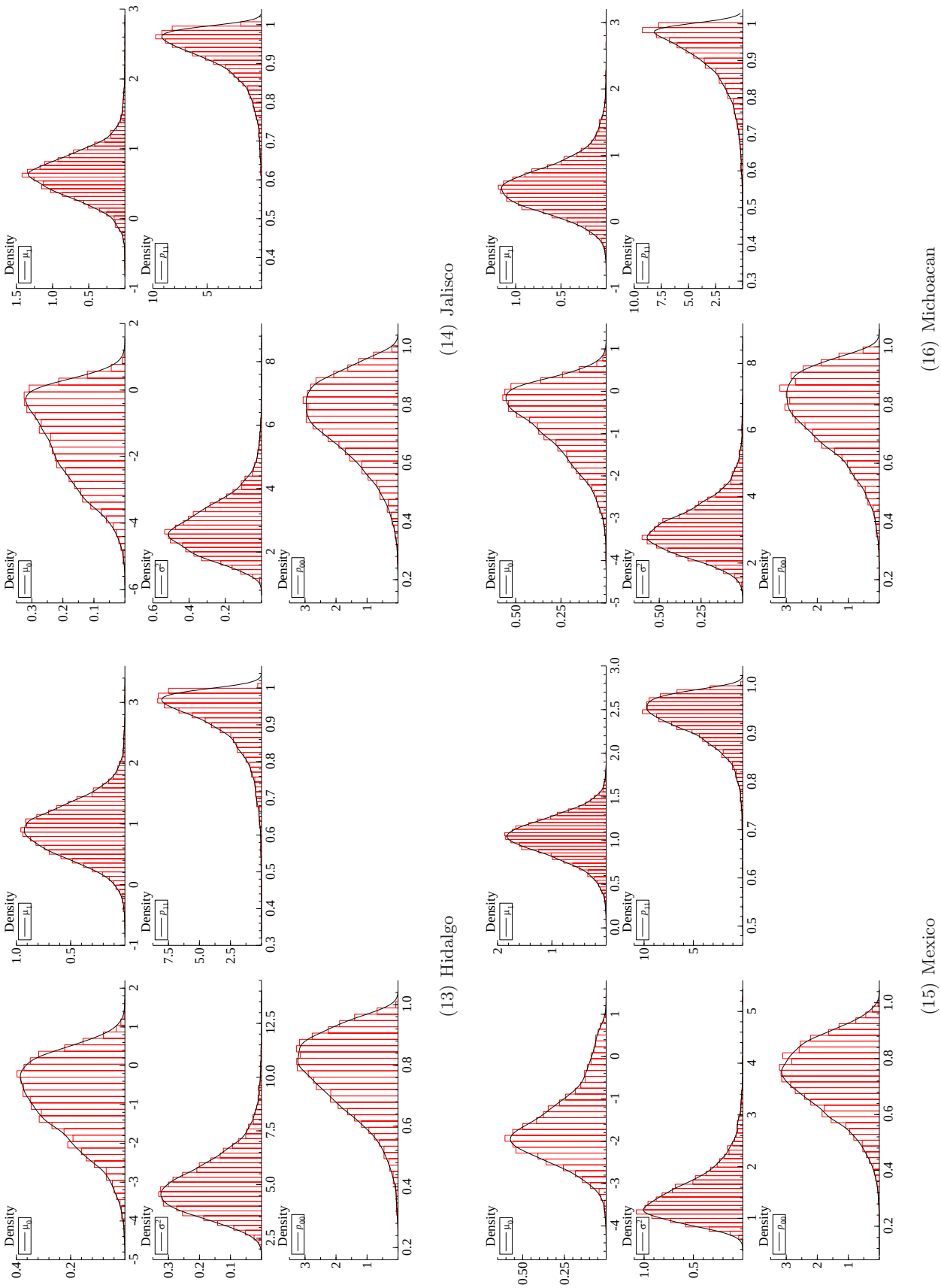
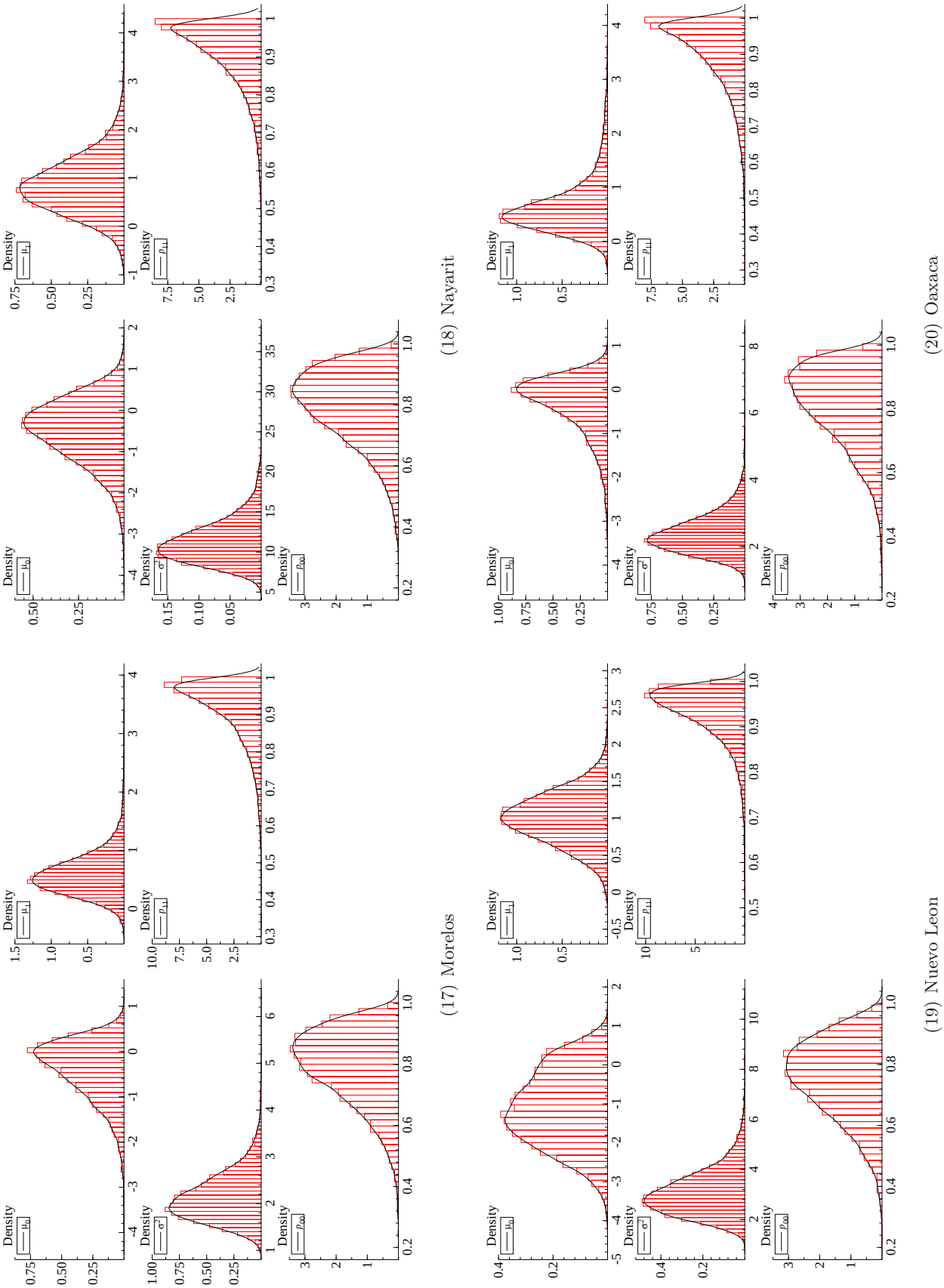


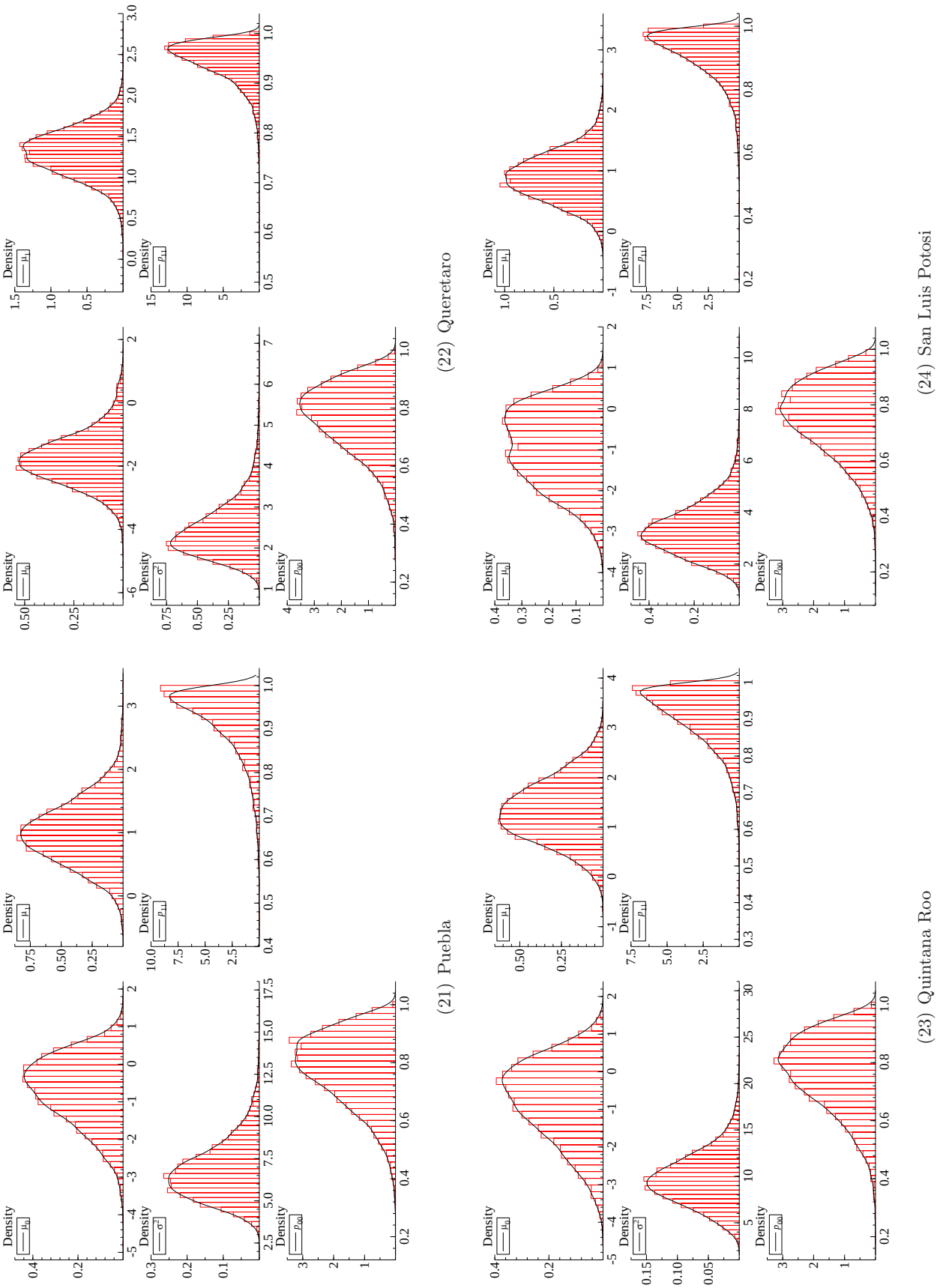
Figure 4: Posterior Distributions (Continued)



(17) Morelos (18) Nayarit

(19) Nuevo Leon (20) Oaxaca

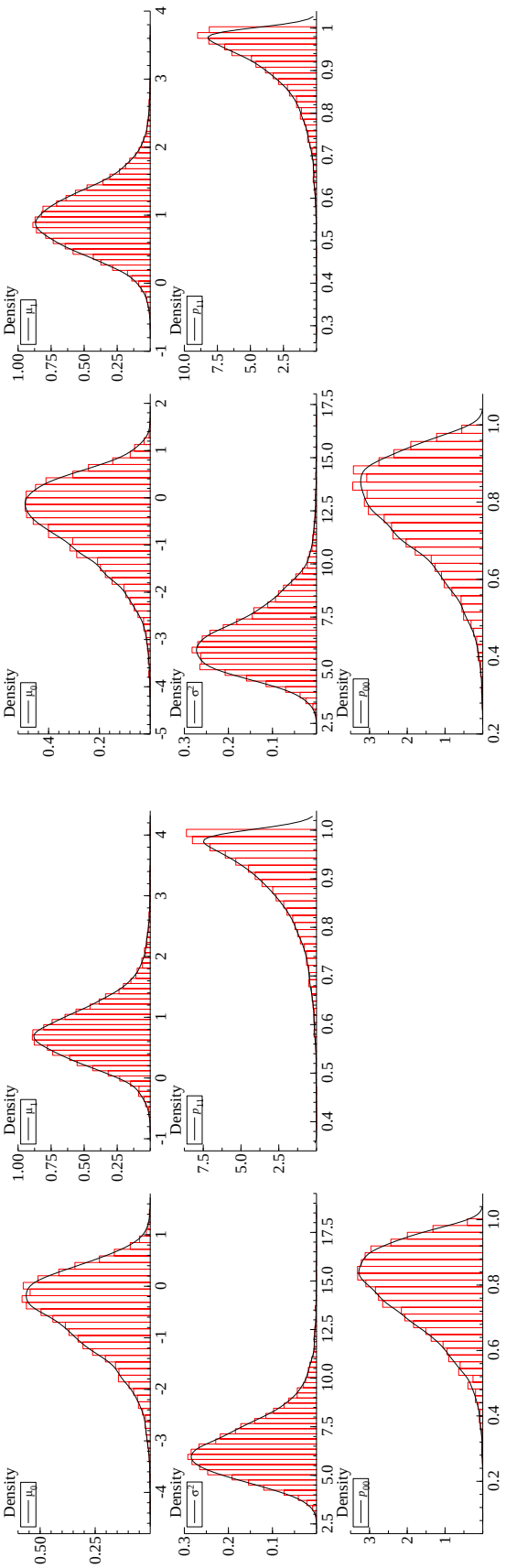
Figure 4: Posterior Distributions (Continued)



(21) Puebla (22) Queretaro

(23) Quintana Roo (24) San Luis Potosi

Figure 4: Posterior Distributions (Continued)



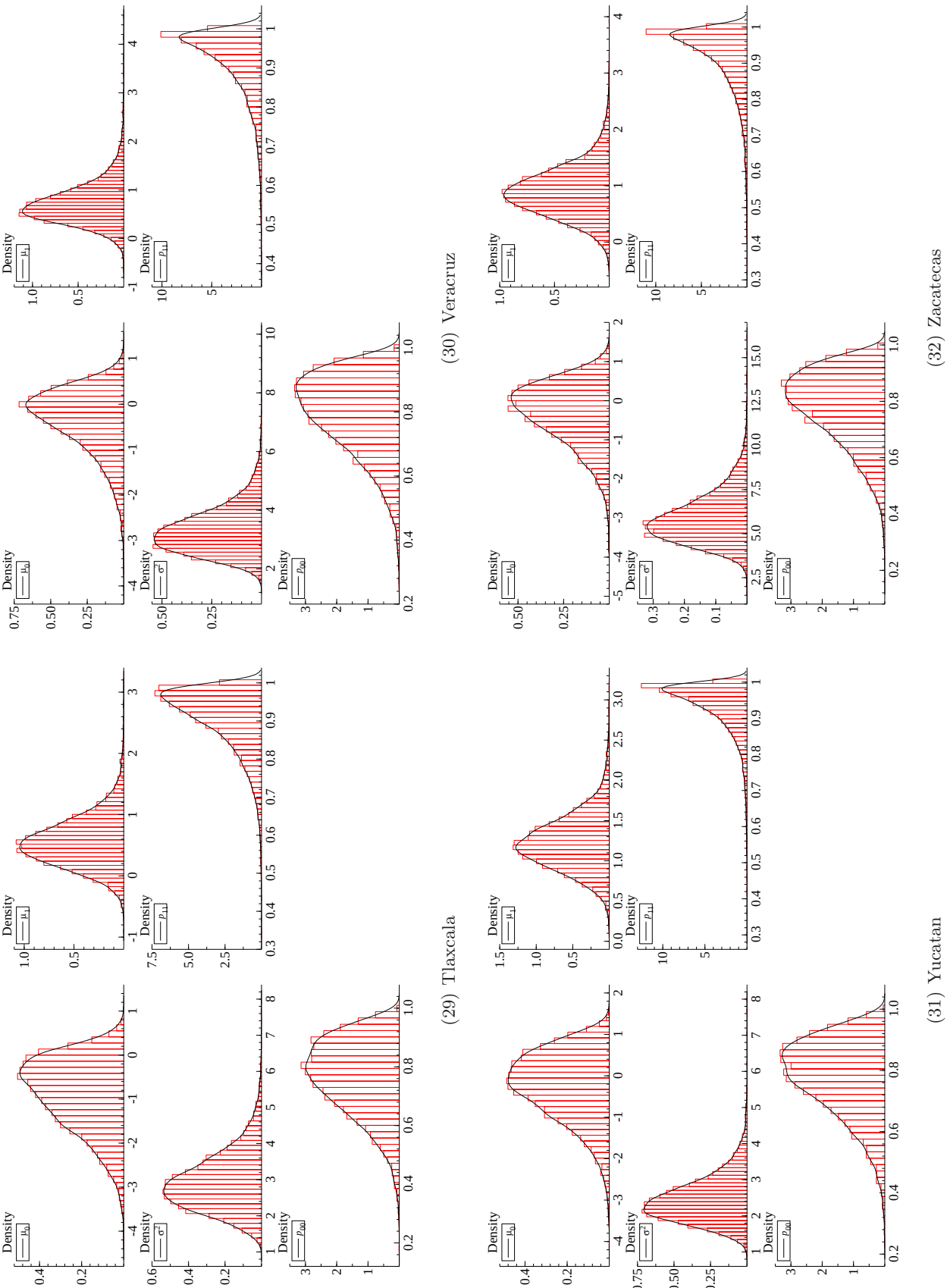
(25) Sinaloa

(26) Sonora

(27) Tabasco

(28) Tamaulipas

Figure 4: Posterior Distributions (Continued)



(29) Tlaxcala (30) Veracruz

(31) Yucatan (32) Zacatecas

Figure 4: Posterior Distributions (Continued)

3 Estimation Results of Markov Switching Model

The estimation results here are obtained by estimating the standard Markov switching model:

$$\boldsymbol{y}_t = \boldsymbol{\mu}_0 \odot (\boldsymbol{\iota}_N - \boldsymbol{s}_t) + \boldsymbol{\mu}_1 \odot \boldsymbol{s}_t + \boldsymbol{\varepsilon}_t,$$

where $\boldsymbol{\varepsilon}_t \sim$ i.i.d. $\mathrm{N}(\boldsymbol{0}, \boldsymbol{\Omega})$ and $\boldsymbol{\Omega} = \mathrm{diag}(\sigma_1^2, \ldots, \sigma_N^2)$.

Table 2

Table 2 shows the point estimates and interval estimates of parameters.

Figure 6

Figure 6 shows the probabilities of recession, which are calculated by $1 - G^{-1} \sum_{g=1}^{G} s_{t,n}^{(g)}$, where G is the number of iterations and the superscript (g) is the gth iteration.

Figure 7

Figure 7 shows the posterior distributions of parameters by state. The solid line indicates density estimates obtained by kernel density estimation.

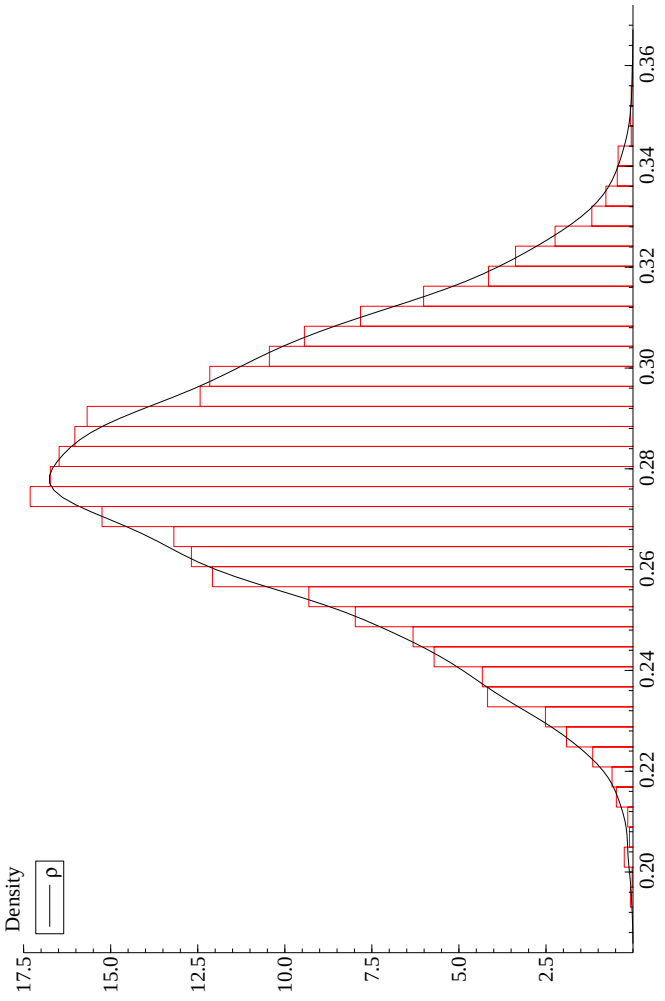


Figure 5: Posterior Distribution of ρ

Table 2: Estimated Parameters

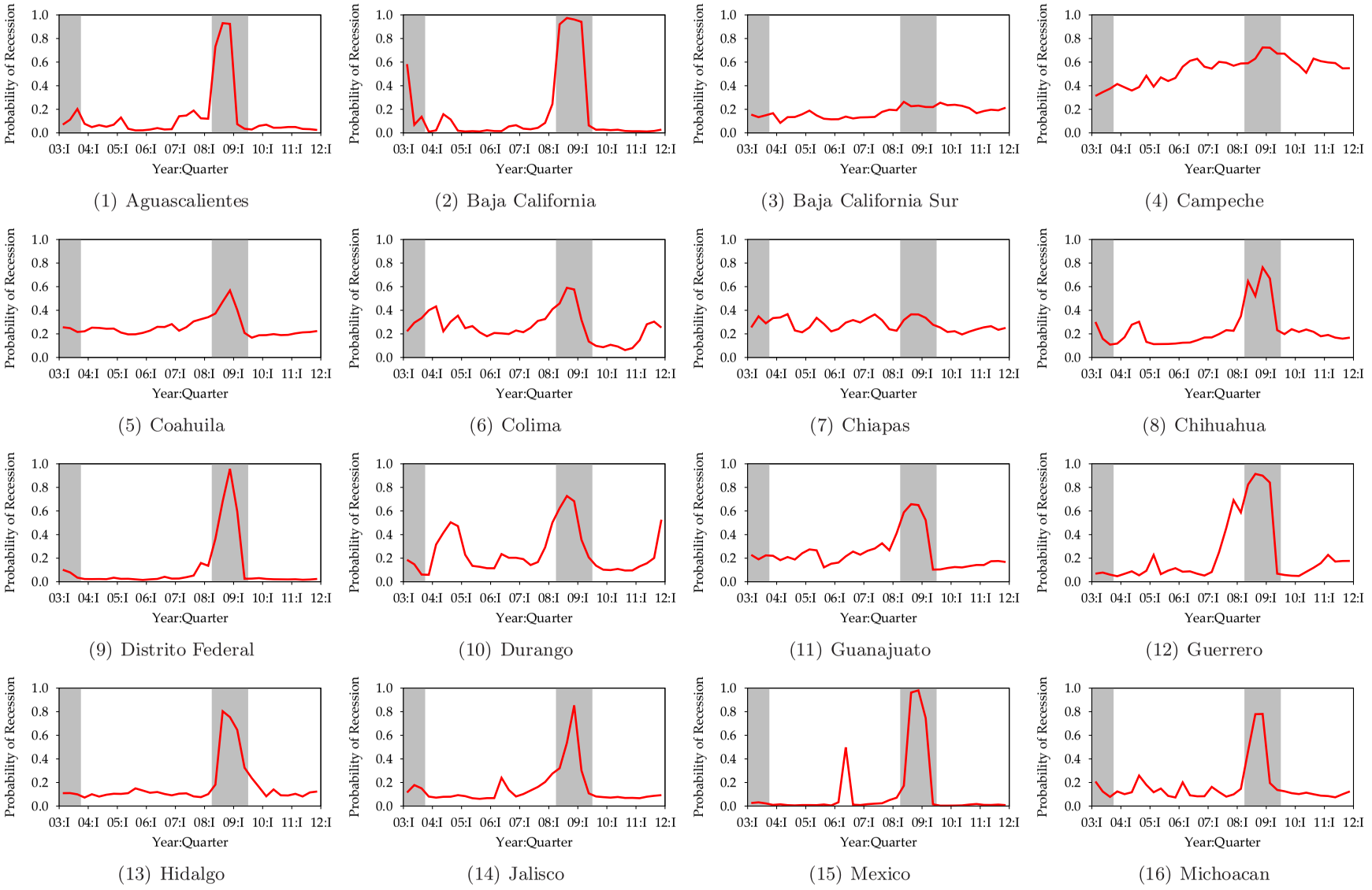
		μ_0			μ_1		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	−1.73	−1.85	[−3.54, 0.55]	1.39	1.39	[0.69, 2.07]
2	Baja California	−2.07	−2.15	[−3.43, −0.18]	1.03	1.04	[0.40, 1.60]
3	Baja California Sur	−0.21	−0.08	[−2.18, 1.12]	1.19	1.18	[0.47, 2.04]
4	Campeche	−1.18	−1.13	[−2.36, −0.30]	0.00	−0.13	[−1.06, 1.72]
5	Coahuila	−0.73	−0.63	[−2.75, 0.79]	0.94	0.93	[−0.23, 2.19]
6	Colima	−0.55	−0.47	[−2.39, 0.89]	1.28	1.23	[0.24, 2.56]
7	Chiapas	−0.54	−0.45	[−2.27, 0.73]	0.77	0.72	[−0.23, 2.05]
8	Chihuahua	−1.20	−1.06	[−3.54, 0.52]	0.85	0.85	[−0.06, 1.81]
9	Distrito Federal	−1.75	−1.77	[−3.57, 0.20]	0.80	0.80	[0.36, 1.27]
10	Durango	−0.71	−0.69	[−2.09, 0.41]	0.71	0.69	[0.11, 1.41]
11	Guanajuato	−0.68	−0.60	[−2.53, 0.73]	1.02	0.99	[0.17, 2.00]
12	Guerrero	−1.05	−1.08	[−2.35, 0.30]	0.79	0.79	[0.23, 1.36]
13	Hidalgo	−1.29	−1.28	[−3.43, 0.67]	1.10	1.11	[0.28, 1.92]
14	Jalisco	−1.54	−1.49	[−4.02, 0.52]	0.91	0.91	[0.23, 1.60]
15	México	−1.97	−2.04	[−3.31, −0.13]	1.24	1.25	[0.73, 1.70]
16	Michoacán	−1.28	−1.30	[−3.28, 0.54]	0.84	0.84	[0.15, 1.55]
17	Morelos	−0.44	−0.36	[−2.01, 0.66]	0.83	0.80	[0.19, 1.64]
18	Nayarit	−0.46	−0.39	[−2.18, 0.87]	0.97	0.93	[−0.09, 2.27]
19	Nuevo León	−1.89	−1.96	[−3.80, 0.34]	1.29	1.29	[0.51, 2.00]
20	Oaxaca	−0.36	−0.19	[−2.14, 0.67]	0.74	0.69	[0.07, 1.73]
21	Puebla	−0.89	−0.82	[−2.92, 0.82]	1.15	1.14	[0.21, 2.16]
22	Querétaro	−2.05	−2.10	[−3.55, −0.30]	1.56	1.57	[0.92, 2.17]
23	Quintana Roo	−0.94	−0.80	[−3.40, 0.91]	1.40	1.37	[0.19, 2.69]
24	San Luis Potosí	−1.35	−1.42	[−3.17, 0.61]	1.20	1.21	[0.38, 1.99]
25	Sinaloa	−0.48	−0.37	[−2.33, 0.82]	0.91	0.88	[0.01, 1.99]
26	Sonora	−0.54	−0.44	[−2.48, 0.93]	1.10	1.08	[0.18, 2.11]
27	Tabasco	−0.32	−0.19	[−2.47, 1.15]	1.21	1.20	[0.50, 1.97]
28	Tamaulipas	−1.25	−1.29	[−2.85, 0.40]	1.03	1.03	[0.22, 1.85]
29	Tlaxcala	−1.11	−1.18	[−2.54, 0.42]	0.96	0.97	[0.15, 1.76]
30	Veracruz	−0.27	−0.14	[−1.98, 0.81]	0.89	0.83	[0.19, 1.96]
31	Yucatán	−0.39	−0.34	[−2.02, 0.86]	1.10	1.09	[0.45, 1.86]
32	Zacatecas	−0.26	−0.14	[−2.15, 1.07]	1.10	1.08	[0.30, 2.02]

Notes: 95% CI indicates 95% credible interval.

Table 2: Estimated Parameters (Continued)

		σ^2			p_{11}			p_{00}		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	3.34	3.14	[1.91, 5.87]	0.93	0.94	[0.78, 0.99]	0.75	0.76	[0.48, 0.94]
2	Baja California	2.47	2.32	[1.37, 4.42]	0.94	0.95	[0.81, 0.99]	0.75	0.76	[0.50, 0.94]
3	Baja California Sur	4.67	4.53	[2.96, 7.33]	0.93	0.96	[0.72, 1.00]	0.78	0.80	[0.49, 0.97]
4	Campeche	4.90	4.73	[3.02, 7.68]	0.86	0.89	[0.60, 0.99]	0.84	0.87	[0.56, 0.98]
5	Coahuila	15.54	15.03	[9.62, 24.27]	0.91	0.93	[0.68, 1.00]	0.78	0.80	[0.49, 0.96]
6	Colima	7.04	6.80	[4.10, 11.35]	0.90	0.92	[0.69, 1.00]	0.78	0.79	[0.51, 0.96]
7	Chiapas	9.50	9.22	[5.87, 14.80]	0.90	0.93	[0.66, 1.00]	0.78	0.80	[0.50, 0.97]
8	Chihuahua	5.76	5.61	[2.91, 9.61]	0.91	0.93	[0.70, 1.00]	0.76	0.78	[0.47, 0.96]
9	Distrito Federal	1.60	1.52	[0.97, 2.68]	0.94	0.95	[0.83, 0.99]	0.76	0.77	[0.49, 0.94]
10	Durango	1.63	1.57	[0.88, 2.72]	0.91	0.93	[0.71, 1.00]	0.78	0.79	[0.51, 0.96]
11	Guanajuato	4.94	4.78	[2.93, 7.93]	0.91	0.93	[0.69, 1.00]	0.78	0.79	[0.50, 0.96]
12	Guerrero	1.64	1.56	[0.95, 2.80]	0.92	0.93	[0.74, 0.99]	0.78	0.80	[0.53, 0.95]
13	Hidalgo	5.08	4.88	[2.89, 8.45]	0.93	0.94	[0.75, 1.00]	0.76	0.78	[0.49, 0.95]
14	Jalisco	3.47	3.32	[1.90, 5.91]	0.93	0.94	[0.76, 0.99]	0.75	0.77	[0.46, 0.95]
15	México	1.74	1.64	[0.98, 3.14]	0.94	0.94	[0.83, 0.99]	0.74	0.75	[0.47, 0.94]
16	Michoacán	3.13	3.00	[1.70, 5.27]	0.92	0.94	[0.74, 1.00]	0.75	0.76	[0.47, 0.95]
17	Morelos	2.41	2.32	[1.47, 3.85]	0.91	0.94	[0.69, 1.00]	0.79	0.81	[0.52, 0.97]
18	Nayarit	12.05	11.66	[7.61, 18.91]	0.91	0.93	[0.68, 1.00]	0.79	0.81	[0.51, 0.97]
19	Nuevo León	4.35	4.12	[2.51, 7.54]	0.94	0.95	[0.82, 0.99]	0.75	0.76	[0.48, 0.94]
20	Oaxaca	2.75	2.65	[1.73, 4.33]	0.90	0.93	[0.65, 1.00]	0.79	0.81	[0.50, 0.97]
21	Puebla	6.97	6.71	[4.14, 11.24]	0.92	0.94	[0.72, 1.00]	0.77	0.78	[0.49, 0.95]
22	Querétaro	3.16	3.02	[1.94, 5.31]	0.95	0.95	[0.85, 0.99]	0.77	0.79	[0.52, 0.95]
23	Quintana Roo	10.10	9.97	[4.24, 16.97]	0.90	0.92	[0.69, 1.00]	0.76	0.78	[0.48, 0.96]
24	San Luis Potosí	3.91	3.74	[2.02, 6.77]	0.92	0.94	[0.75, 0.99]	0.74	0.76	[0.47, 0.95]
25	Sinaloa	6.64	6.41	[4.13, 10.50]	0.91	0.93	[0.67, 1.00]	0.78	0.80	[0.50, 0.97]
26	Sonora	7.51	7.26	[4.57, 11.76]	0.92	0.94	[0.71, 1.00]	0.77	0.79	[0.49, 0.96]
27	Tabasco	4.46	4.32	[2.72, 7.00]	0.93	0.96	[0.73, 1.00]	0.77	0.79	[0.47, 0.97]
28	Tamaulipas	3.66	3.53	[2.05, 6.12]	0.91	0.93	[0.73, 0.99]	0.78	0.79	[0.53, 0.95]
29	Tlaxcala	2.62	2.49	[1.29, 4.67]	0.89	0.91	[0.70, 0.99]	0.74	0.75	[0.48, 0.94]
30	Veracruz	3.44	3.33	[2.17, 5.38]	0.91	0.94	[0.68, 1.00]	0.80	0.81	[0.51, 0.97]
31	Yucatán	2.63	2.54	[1.56, 4.18]	0.92	0.94	[0.73, 1.00]	0.78	0.80	[0.51, 0.96]
32	Zacatecas	5.89	5.70	[3.69, 9.13]	0.92	0.95	[0.68, 1.00]	0.78	0.80	[0.47, 0.97]

Notes: 95% CI indicates 95% credible interval.



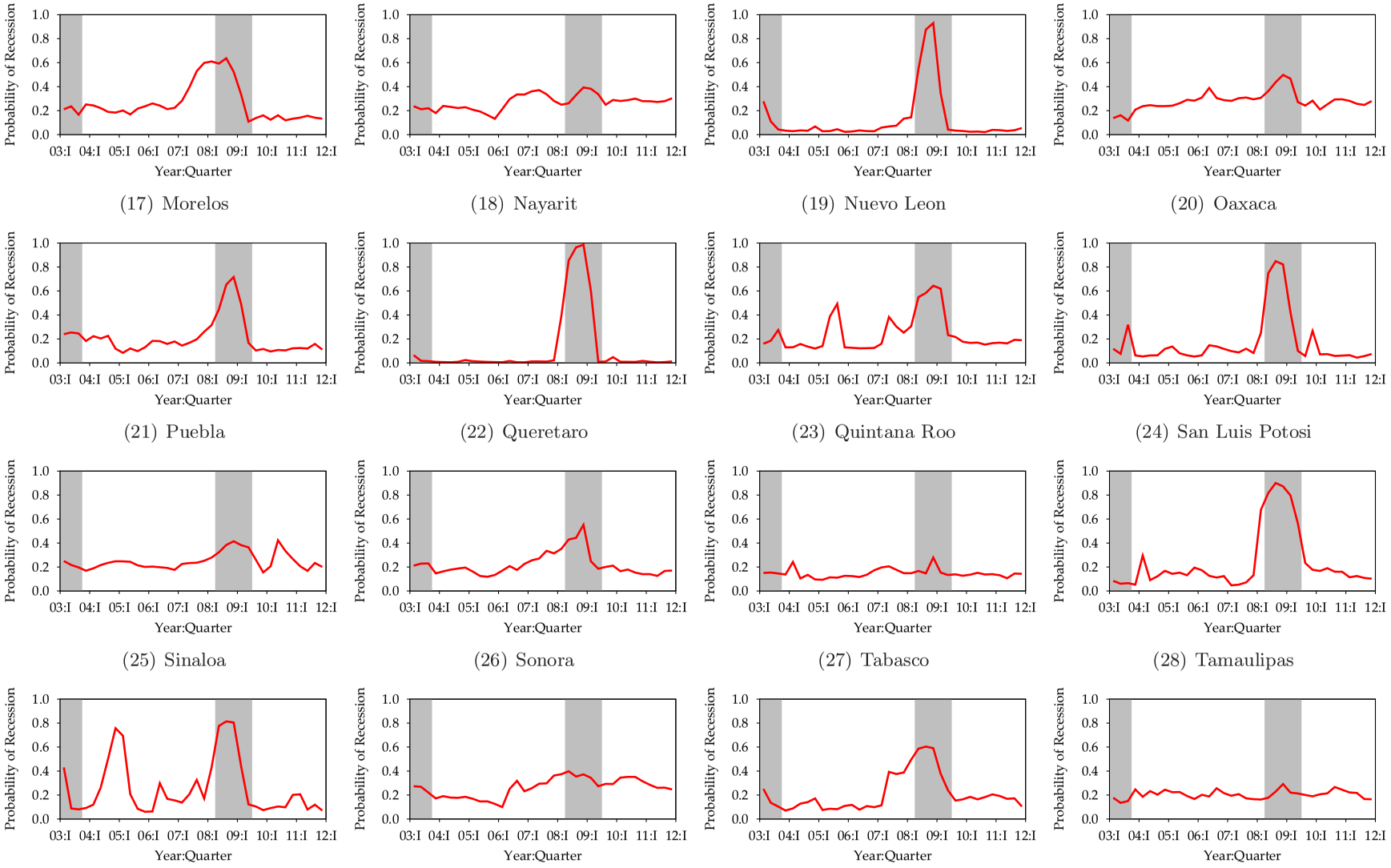
(1) Aguascalientes (2) Baja California (3) Baja California Sur (4) Campeche

(5) Coahuila (6) Colima (7) Chiapas (8) Chihuahua

(9) Distrito Federal (10) Durango (11) Guanajuato (12) Guerrero

(13) Hidalgo (14) Jalisco (15) Mexico (16) Michoacan

Figure 6: Recession Probabilities



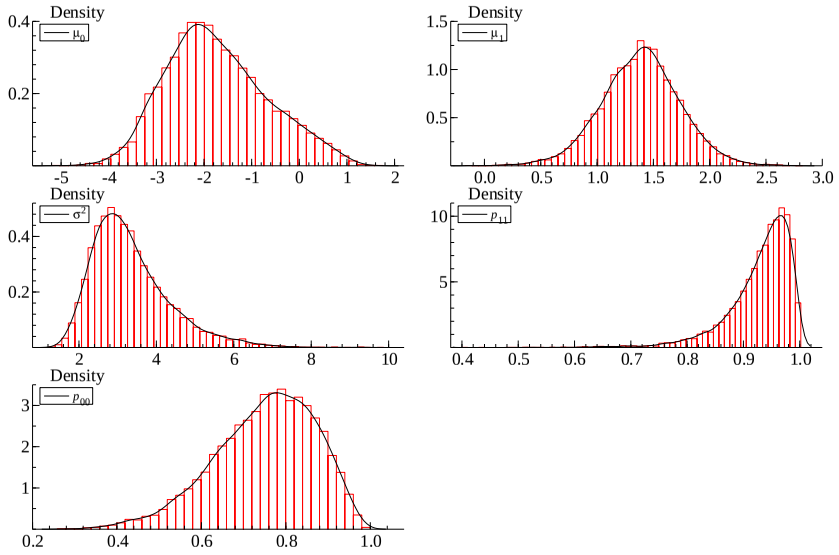
(17) Morelos (18) Nayarit (19) Nuevo Leon (20) Oaxaca

(21) Puebla (22) Queretaro (23) Quintana Roo (24) San Luis Potosi

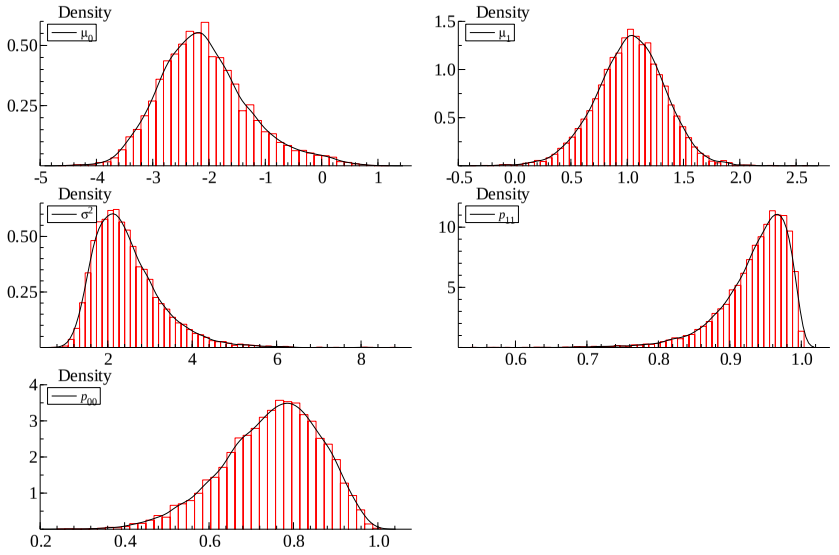
(25) Sinaloa (26) Sonora (27) Tabasco (28) Tamaulipas

(29) Tlaxcala (30) Veracruz (31) Yucatan (32) Zacatecas

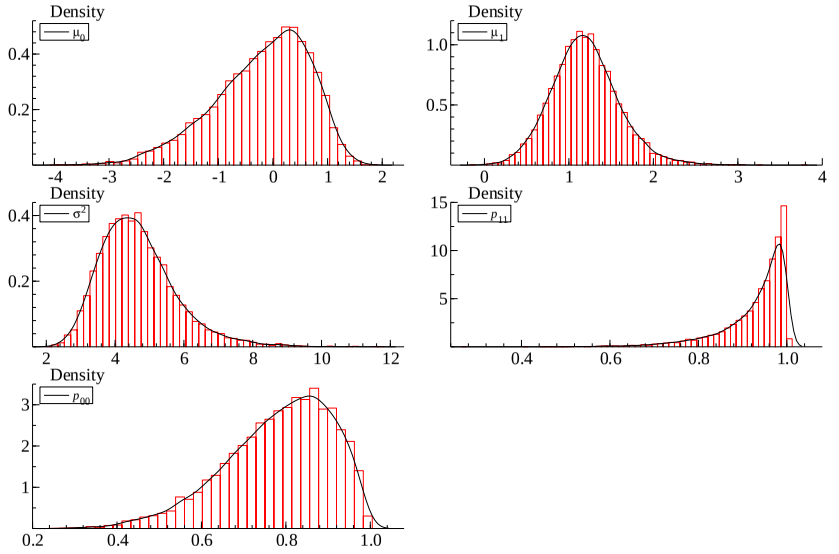
Figure 6: Recession Probabilities (Continued)



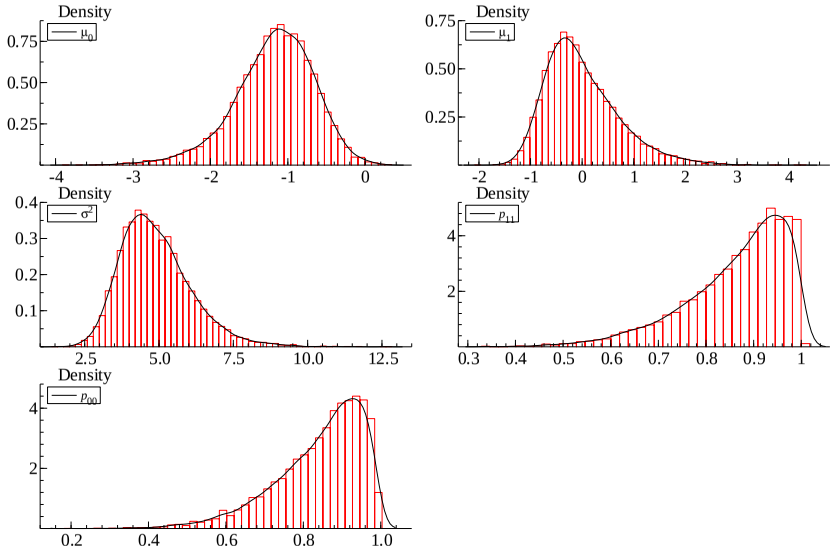
(1) Aguascalientes



(2) Baja California

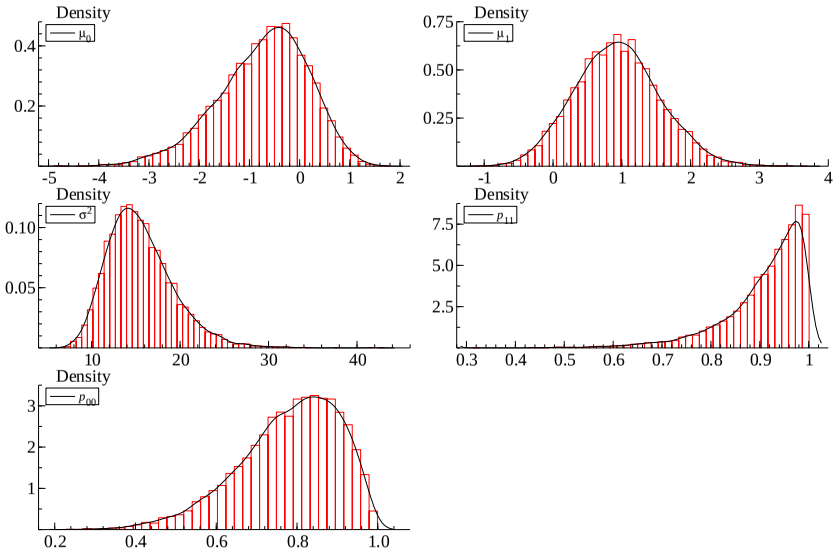


(3) Baja California Sur

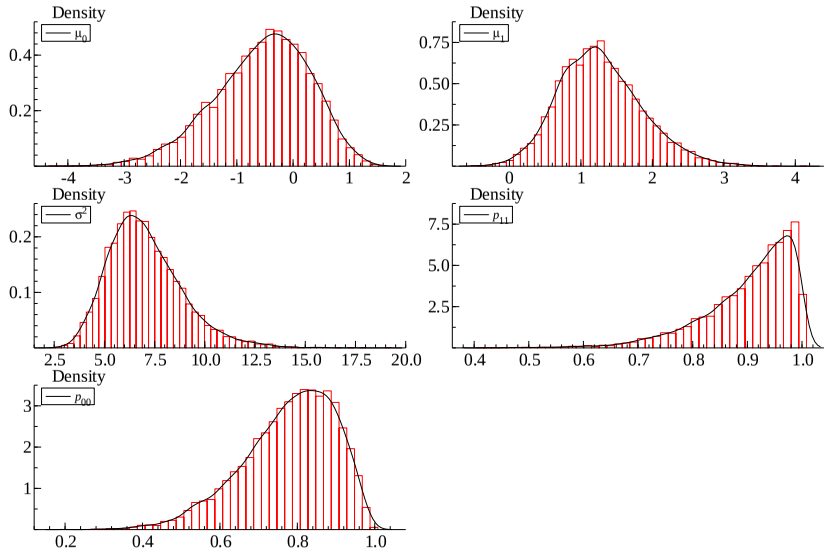


(4) Campeche

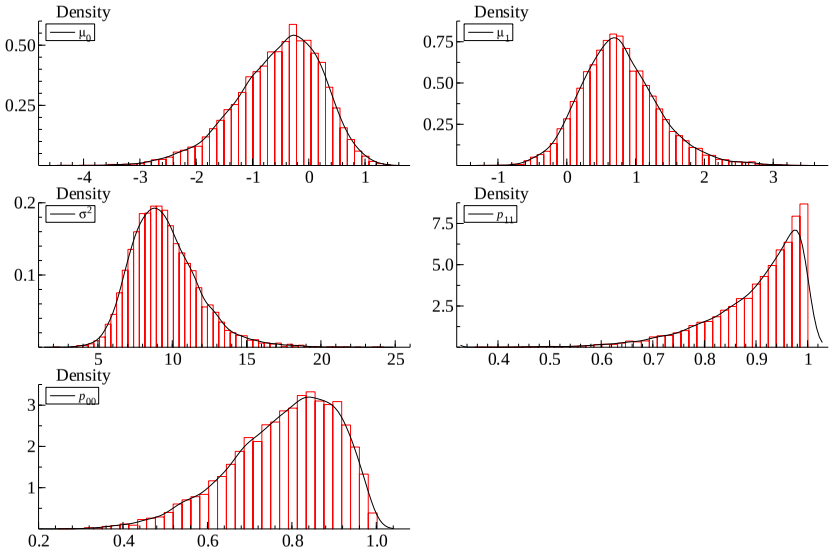
Figure 7: Posterior Distributions



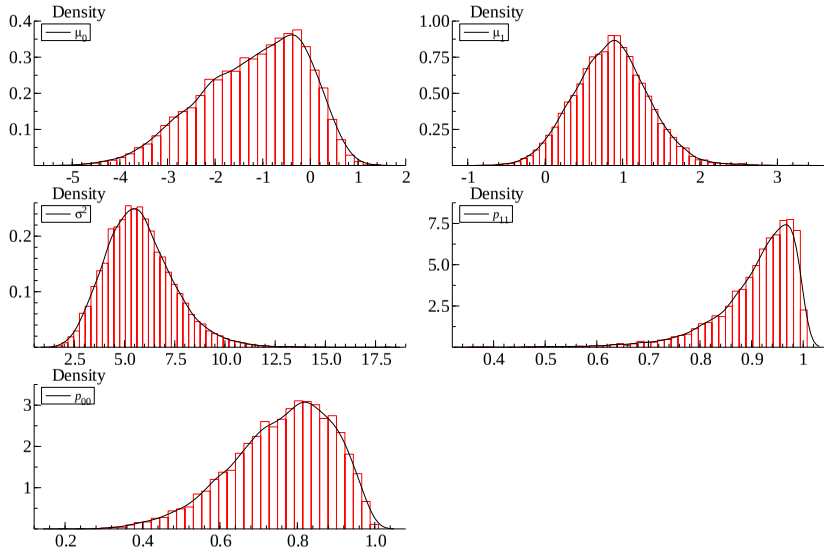
(5) Coahuila



(6) Colima

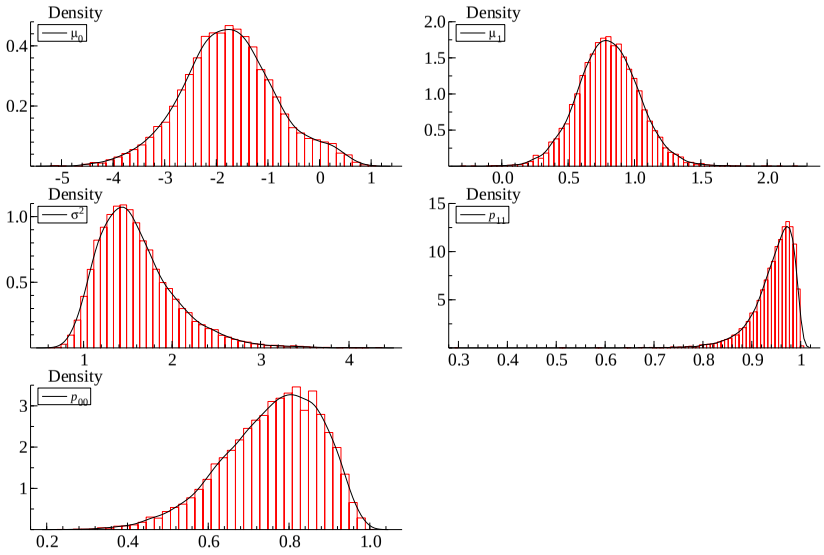


(7) Chiapas

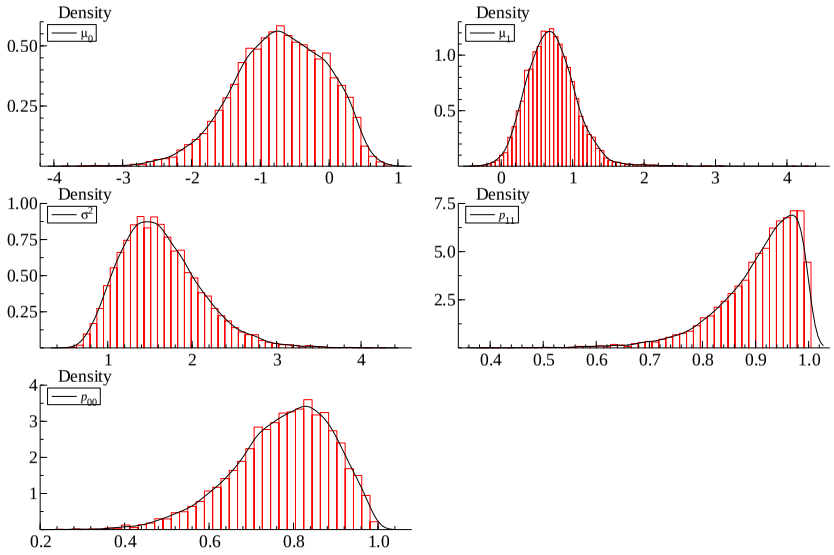


(8) Chihuahua

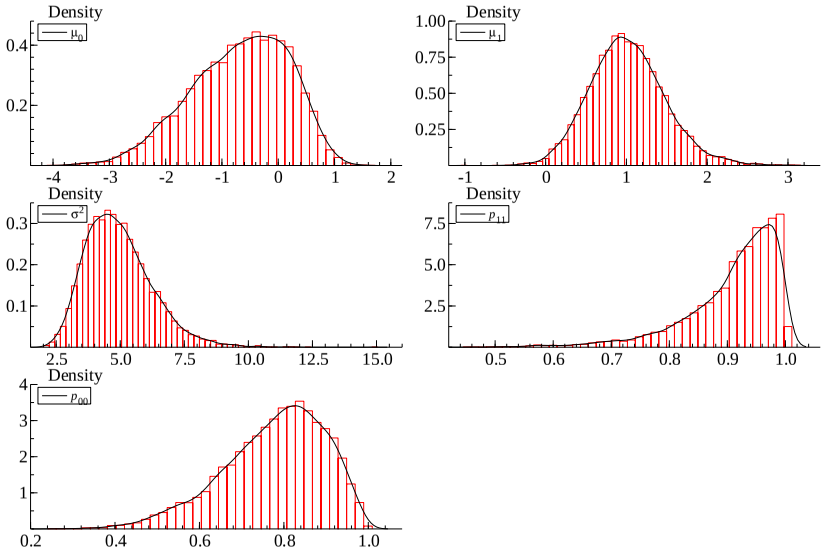
Figure 7: Posterior Distributions (Continued)



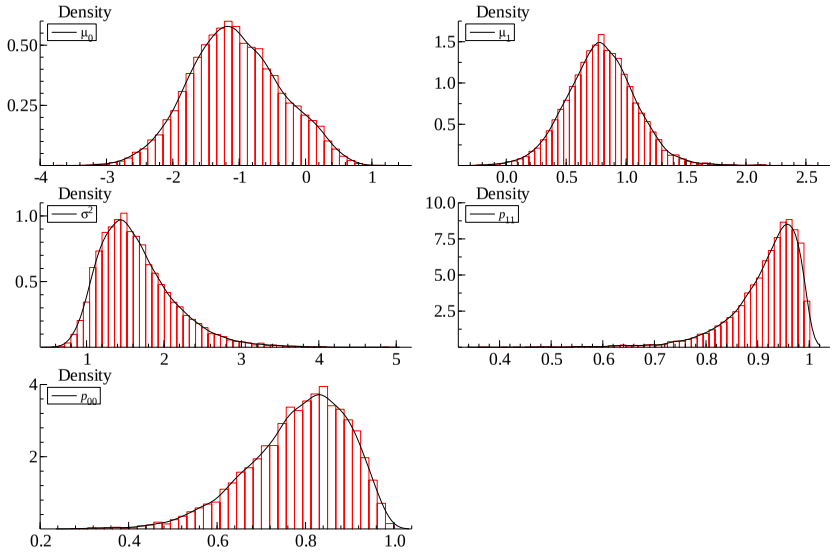
(9) Distrito Federal



(10) Durango

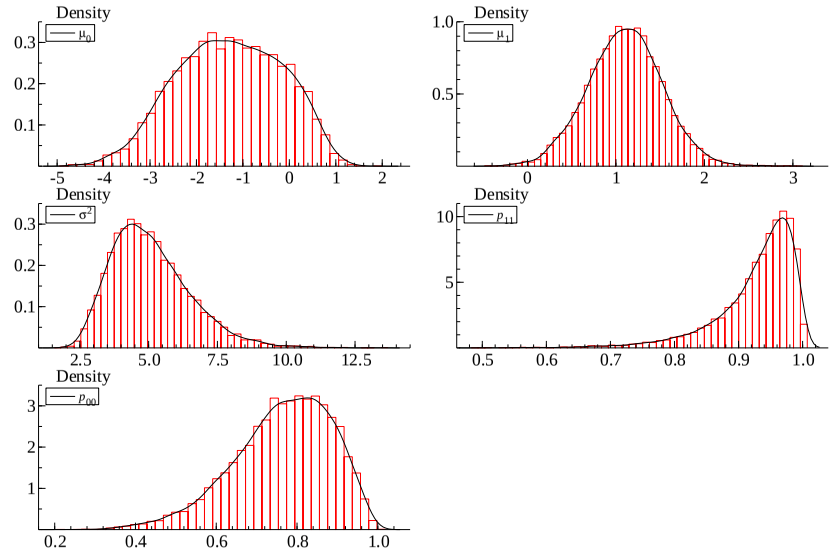


(11) Guanajuato

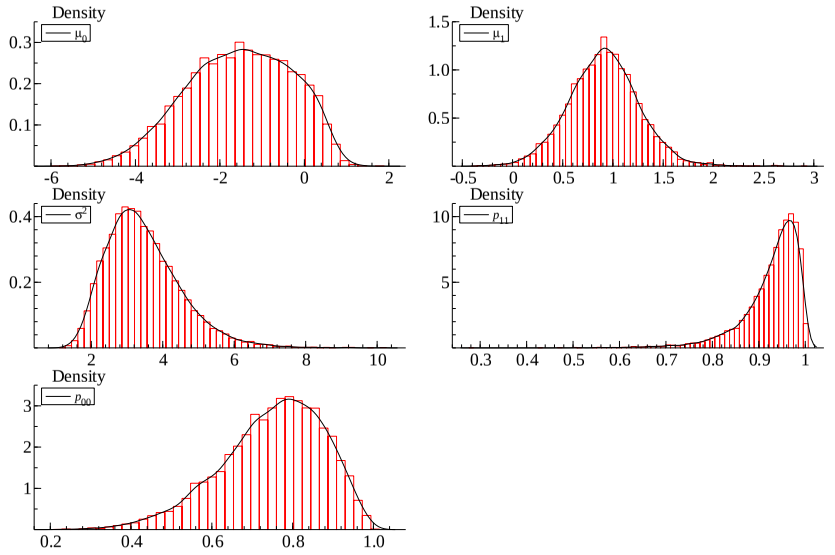


(12) Guerrero

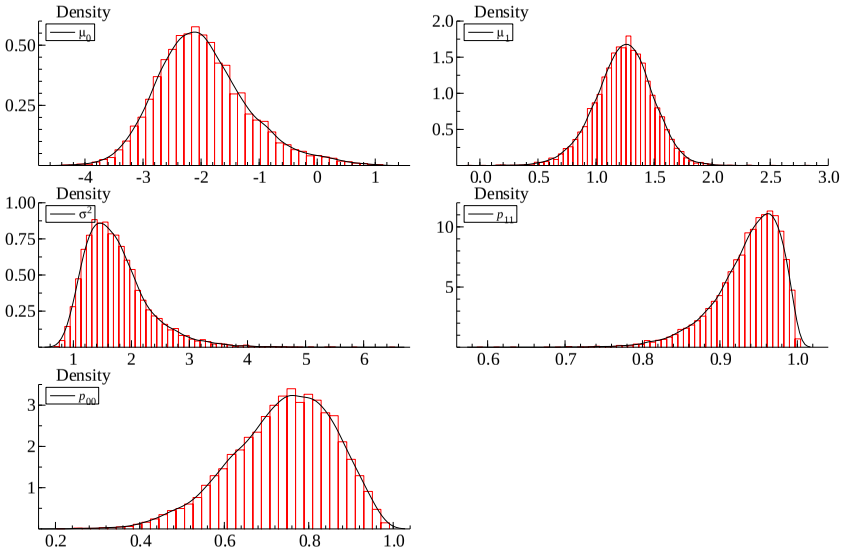
Figure 7: Posterior Distributions (Continued)



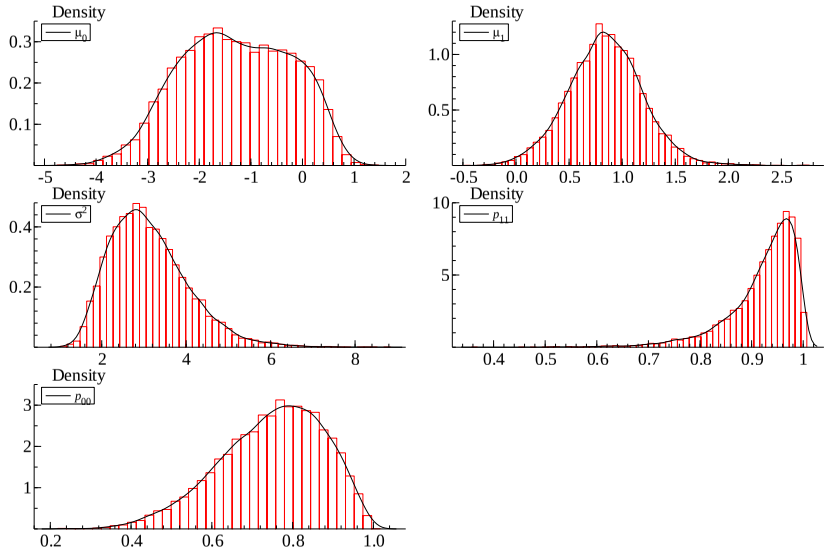
(13) Hidalgo



(14) Jalisco

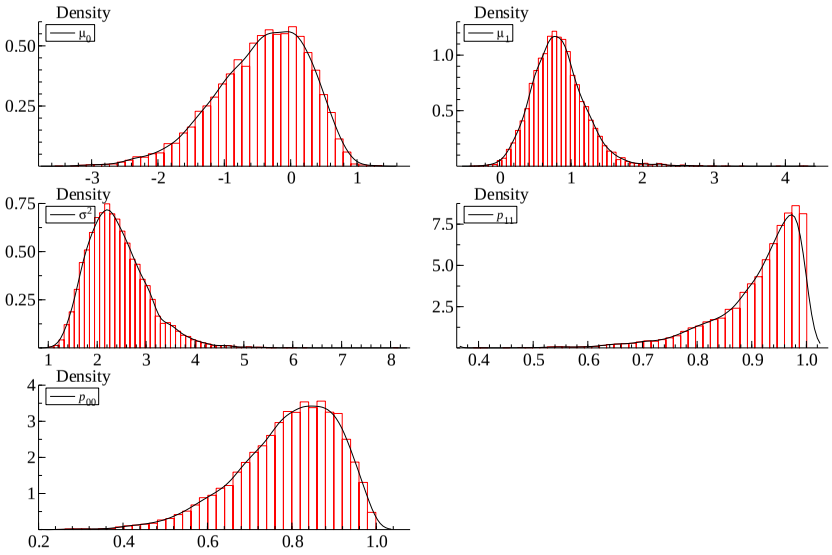


(15) Mexico

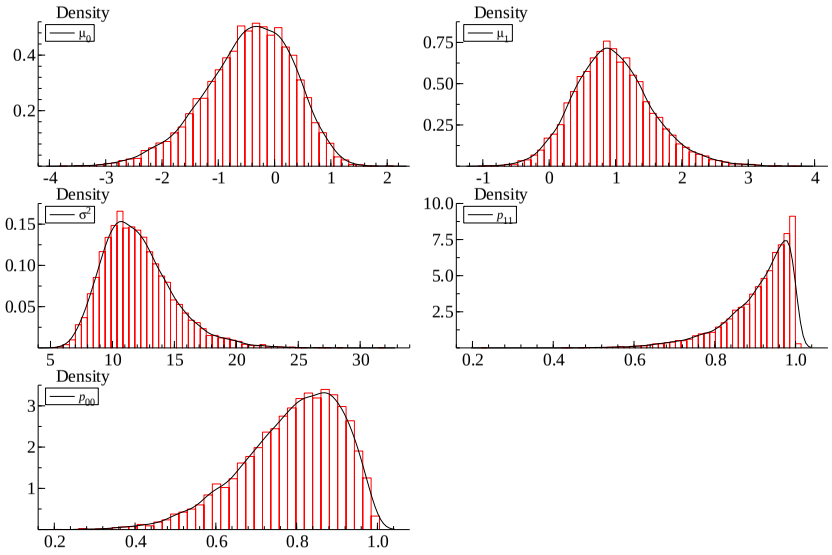


(16) Michoacan

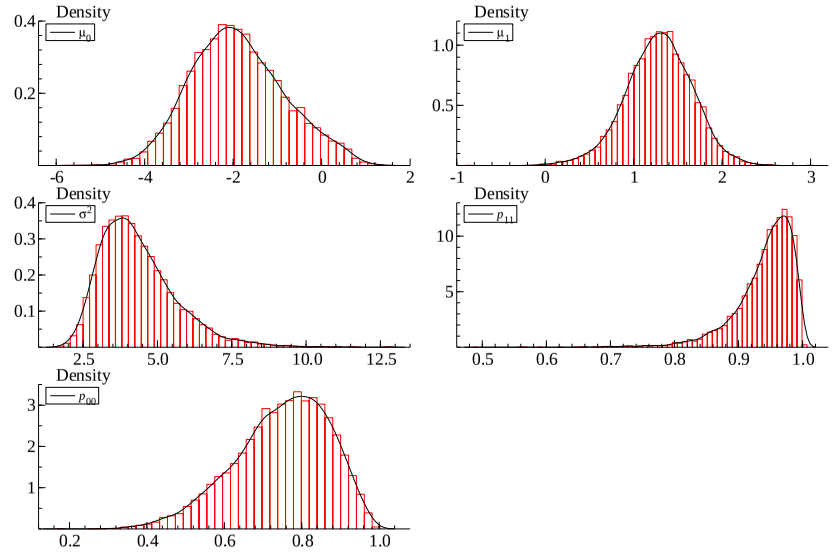
Figure 7: Posterior Distributions (Continued)



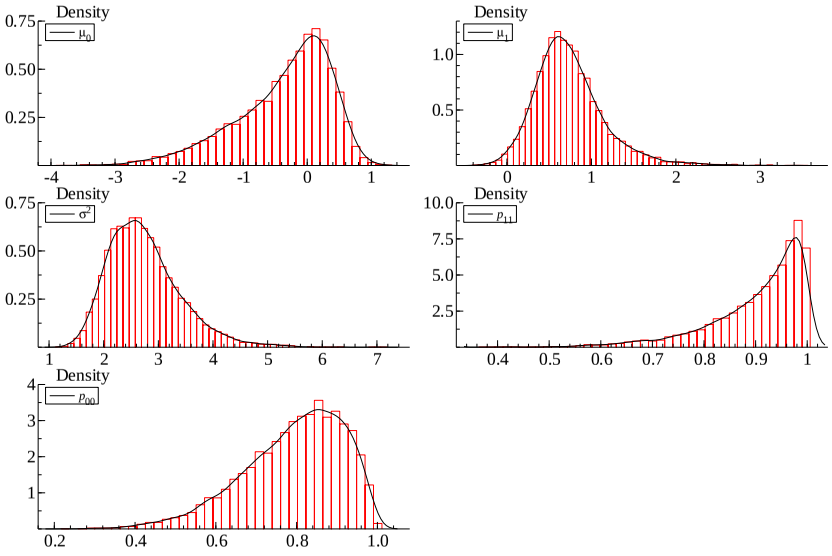
(17) Morelos



(18) Nayarit

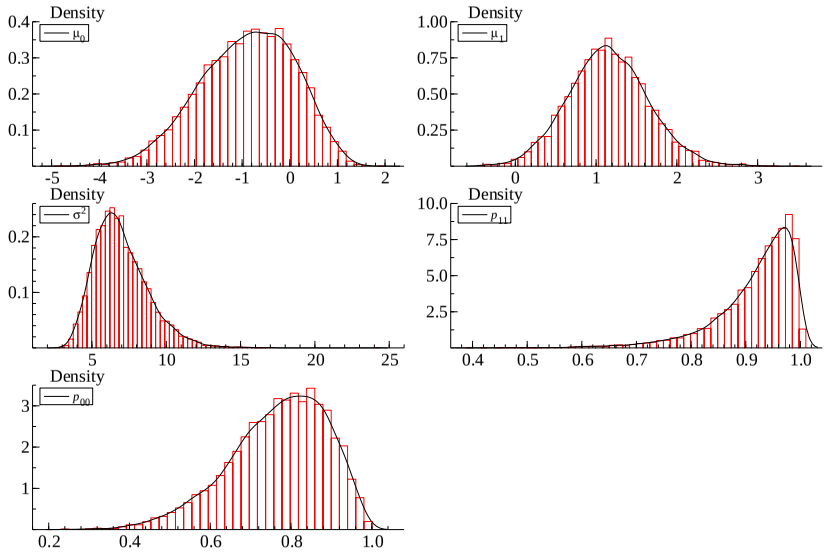


(19) Nuevo Leon

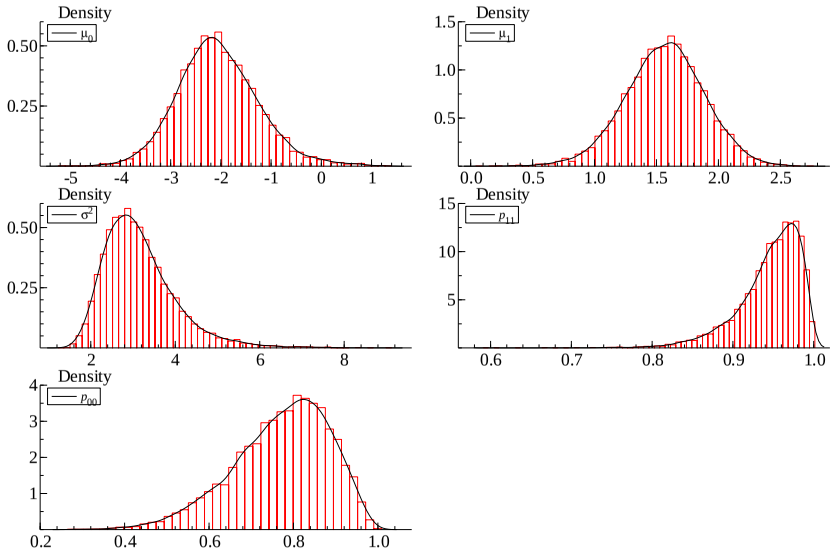


(20) Oaxaca

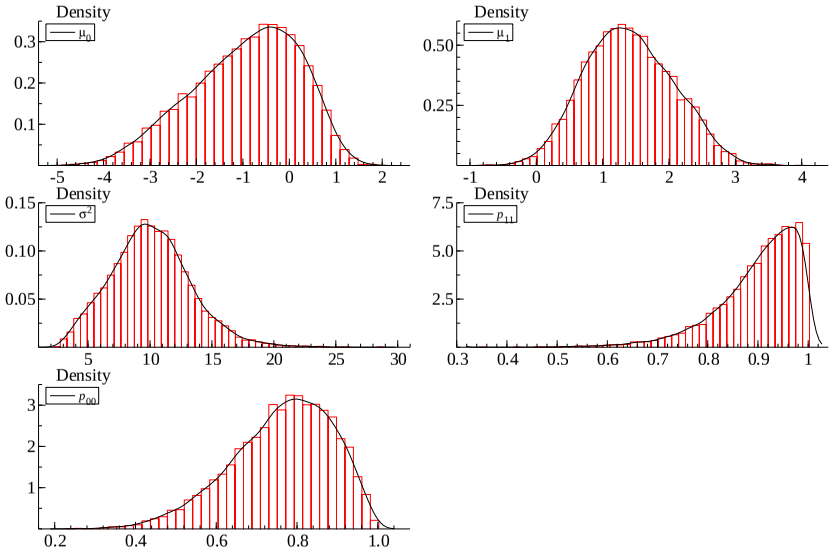
Figure 7: Posterior Distributions (Continued)



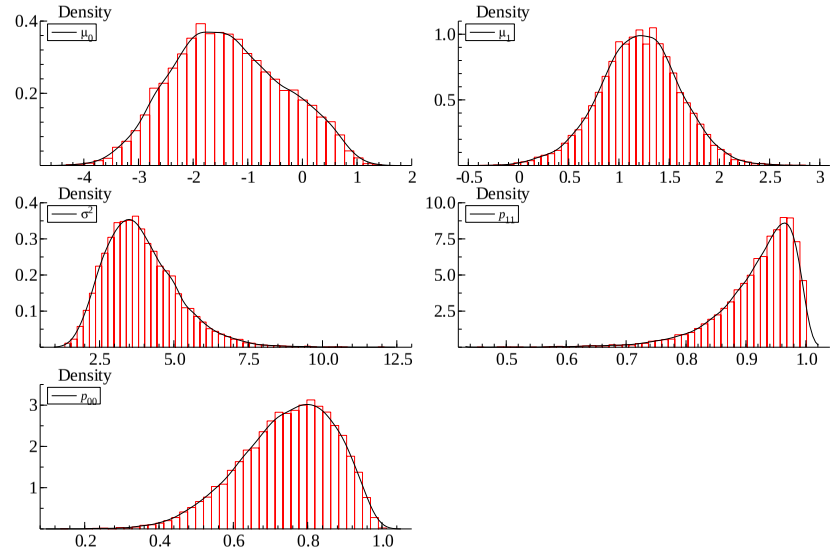
(21) Puebla



(22) Queretaro

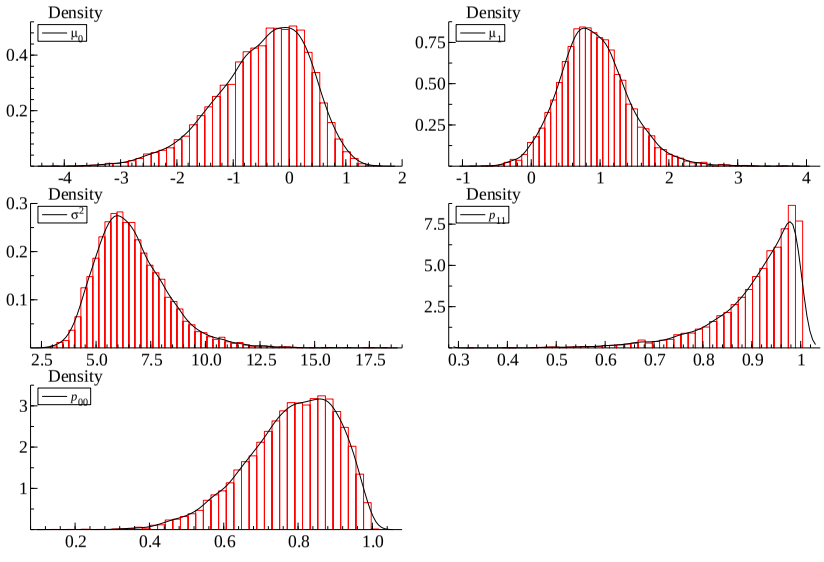


(23) Quintana Roo

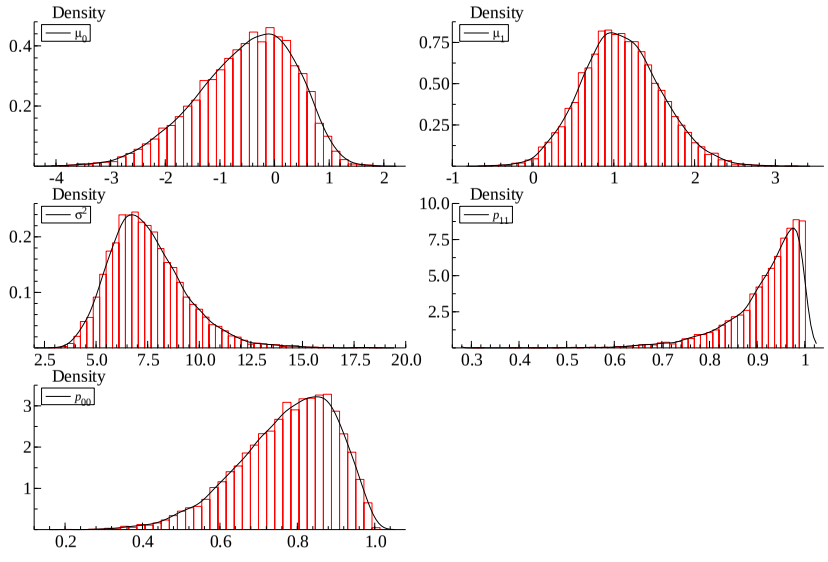


(24) San Luis Potosi

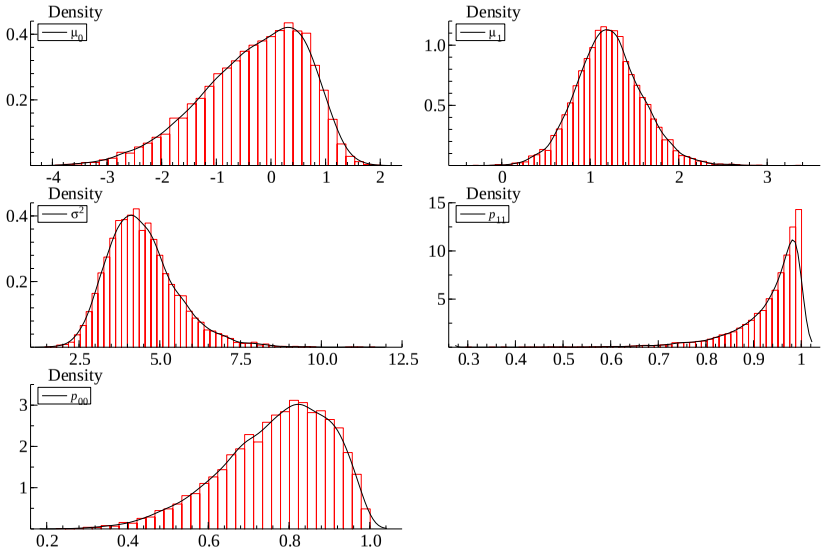
Figure 7: Posterior Distributions (Continued)



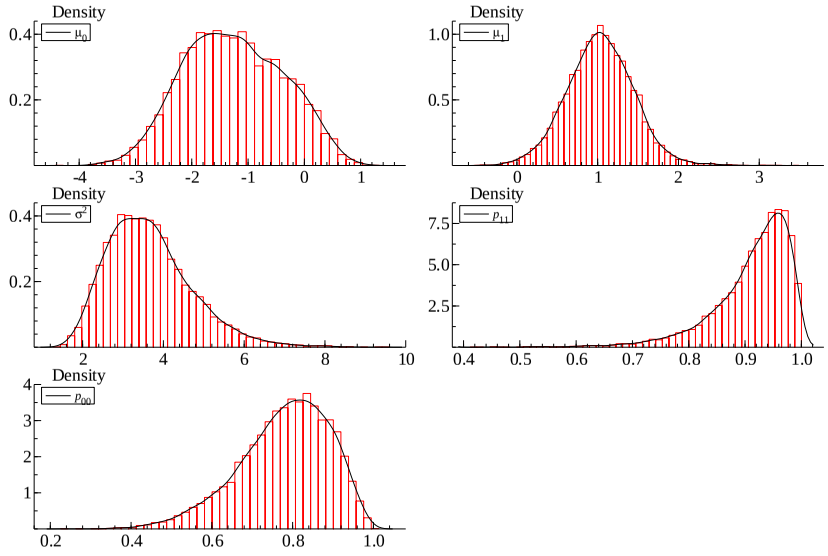
(25) Sinaloa



(26) Sonora

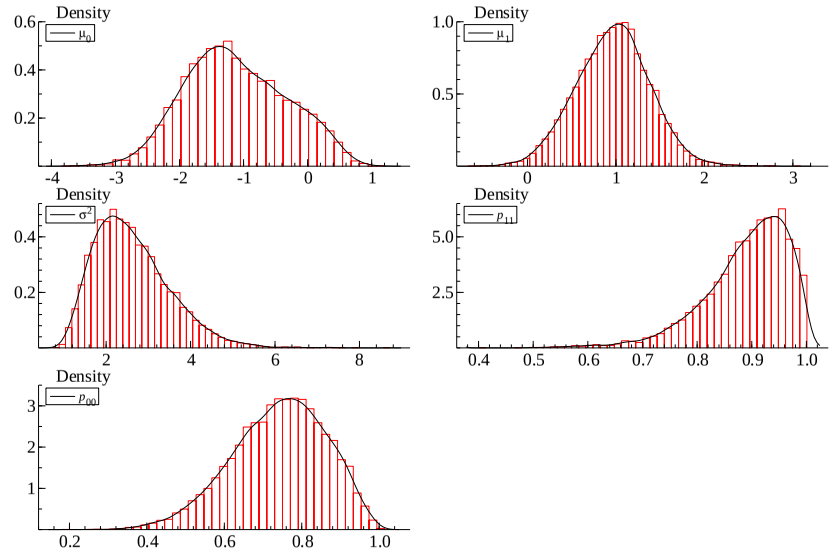


(27) Tabasco

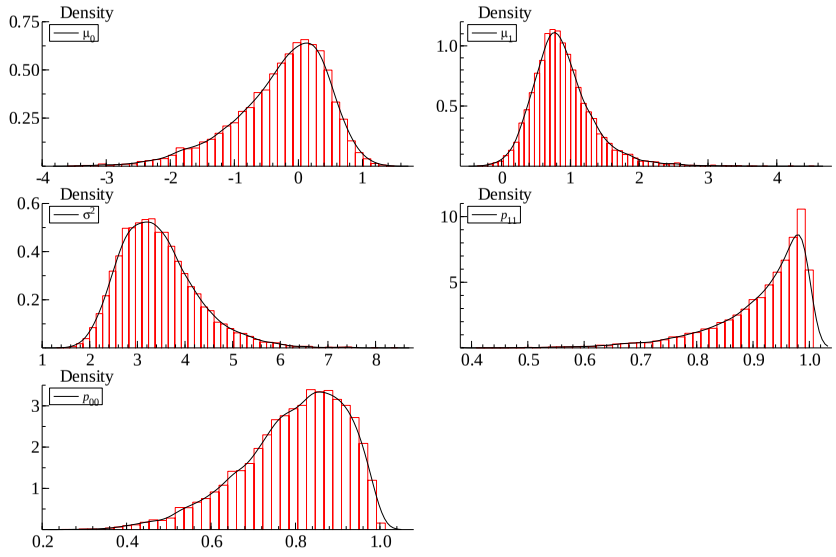


(28) Tamaulipas

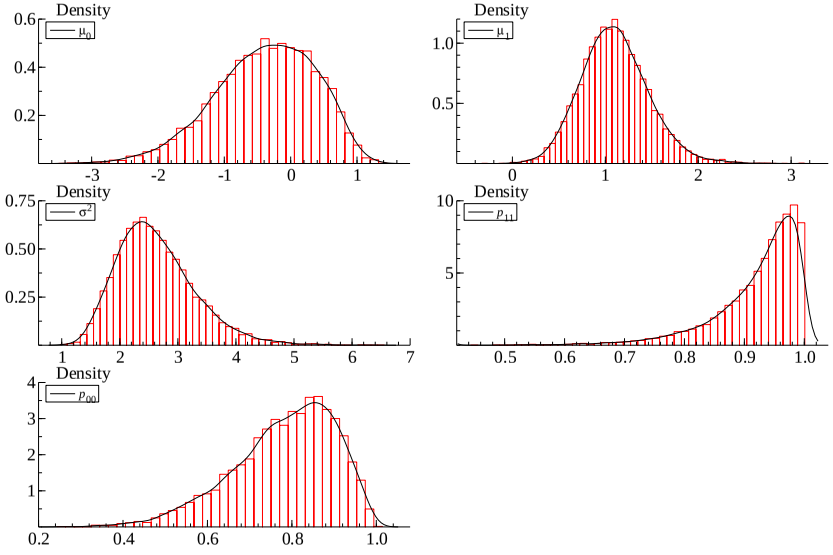
Figure 7: Posterior Distributions (Continued)



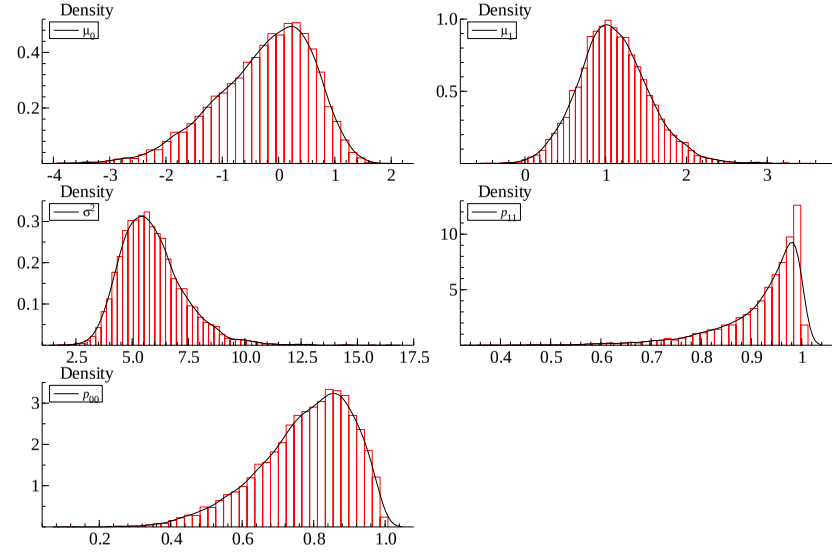
(29) Tlaxcala



(30) Veracruz



(31) Yucatan



(32) Zacatecas

Figure 7: Posterior Distributions (Continued)

4 Estimation Results of Markov Switching Model with First-Order Autoregressive Process

The estimation results here are obtained by estimating the standard Markov switching model:

$$\boldsymbol{y}_t = \boldsymbol{\Phi}\boldsymbol{y}_t + \boldsymbol{\mu}_0 \odot (\boldsymbol{\iota}_N - \boldsymbol{s}_t) + \boldsymbol{\mu}_1 \odot \boldsymbol{s}_t + \boldsymbol{\varepsilon}_t,$$

where $\boldsymbol{\Phi} = \text{diag}(\phi_1, \ldots, \phi_N)$, $\boldsymbol{\varepsilon}_t \sim$ i.i.d. $\text{N}(\boldsymbol{0}, \boldsymbol{\Omega})$, and $\boldsymbol{\Omega} = \text{diag}(\sigma_1^2, \ldots, \sigma_N^2)$.

Table 3

Table 3 shows the point estimates and interval estimates of parameters.

Figure 8

Figure 8 shows the probabilities of recession, which are calculated by $1 - G^{-1} \sum_{g=1}^{G} s_{t,n}^{(g)}$, where G is the number of iterations and the superscript (g) is the gth iteration.

Figure 9

Figure 9 shows the posterior distributions of parameters by state. The solid line indicates density estimates obtained by kernel density estimation.

Table 3: Estimated Parameters

		μ_0			μ_1			ϕ		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	−1.29	−1.33	[−3.27, 0.62]	1.16	1.17	[0.29, 1.99]	0.20	0.20	[−0.11, 0.53]
2	Baja California	−2.14	−2.25	[−3.67, 0.11]	1.11	1.13	[0.40, 1.72]	−0.04	−0.05	[−0.32, 0.32]
3	Baja California Sur	−0.02	0.10	[−2.07, 1.44]	1.69	1.66	[0.84, 2.75]	−0.40	−0.40	[−0.69, −0.09]
4	Campeche	−1.43	−1.38	[−2.63, −0.50]	−0.16	−0.28	[−1.28, 1.59]	−0.22	−0.22	[−0.53, 0.09]
5	Coahuila	−0.69	−0.61	[−2.57, 0.76]	0.89	0.87	[−0.30, 2.20]	0.13	0.14	[−0.18, 0.45]
6	Colima	−0.56	−0.48	[−2.34, 0.78]	1.04	0.99	[0.02, 2.37]	0.16	0.16	[−0.15, 0.48]
7	Chiapas	−0.64	−0.57	[−2.33, 0.63]	0.75	0.69	[−0.27, 2.10]	−0.10	−0.10	[−0.42, 0.21]
8	Chihuahua	−1.53	−1.45	[−4.04, 0.48]	1.02	1.04	[0.04, 1.93]	−0.05	−0.06	[−0.37, 0.29]
9	Distrito Federal	−1.89	−1.95	[−3.73, 0.25]	0.88	0.89	[0.28, 1.43]	−0.05	−0.05	[−0.45, 0.37]
10	Durango	−0.65	−0.55	[−2.20, 0.36]	0.51	0.46	[−0.10, 1.38]	0.32	0.32	[−0.05, 0.67]
11	Guanajuato	−0.82	−0.73	[−2.78, 0.72]	1.07	1.06	[0.12, 2.11]	−0.02	−0.02	[−0.36, 0.34]
12	Guerrero	−1.06	−1.09	[−2.44, 0.31]	0.76	0.77	[0.08, 1.42]	−0.02	−0.02	[−0.38, 0.39]
13	Hidalgo	−1.89	−1.99	[−3.99, 0.49]	1.32	1.34	[0.37, 2.14]	−0.18	−0.19	[−0.49, 0.18]
14	Jalisco	−1.42	−1.36	[−3.84, 0.51]	0.88	0.88	[0.11, 1.68]	0.03	0.03	[−0.32, 0.35]
15	México	−1.61	−1.75	[−3.31, 0.41]	1.02	1.02	[0.31, 1.67]	0.20	0.21	[−0.16, 0.56]
16	Michoacán	−1.39	−1.44	[−3.43, 0.53]	0.93	0.93	[0.19, 1.66]	−0.04	−0.04	[−0.36, 0.29]
17	Morelos	−0.77	−0.79	[−2.08, 0.53]	1.03	1.05	[0.27, 1.77]	−0.21	−0.22	[−0.58, 0.19]
18	Nayarit	−0.45	−0.38	[−2.20, 0.91]	1.03	0.99	[−0.08, 2.41]	−0.05	−0.05	[−0.37, 0.27]
19	Nuevo León	−1.88	−1.96	[−3.93, 0.43]	1.27	1.28	[0.40, 2.05]	0.10	0.10	[−0.25, 0.41]
20	Oaxaca	−0.53	−0.36	[−2.40, 0.67]	0.79	0.76	[0.11, 1.68]	−0.21	−0.21	[−0.53, 0.11]
21	Puebla	−0.85	−0.78	[−2.92, 0.76]	1.13	1.12	[0.12, 2.18]	0.06	0.05	[−0.29, 0.40]
22	Querétaro	−1.89	−1.98	[−3.65, 0.32]	1.44	1.44	[0.53, 2.29]	0.13	0.14	[−0.27, 0.49]
23	Quintana Roo	−0.98	−0.83	[−3.40, 0.88]	1.40	1.36	[0.10, 2.84]	−0.06	−0.06	[−0.37, 0.27]
24	San Luis Potosí	−1.37	−1.43	[−3.26, 0.62]	1.24	1.26	[0.27, 2.09]	−0.02	−0.02	[−0.37, 0.35]
25	Sinaloa	−0.47	−0.36	[−2.33, 0.84]	0.97	0.93	[0.05, 2.16]	−0.03	−0.03	[−0.36, 0.30]
26	Sonora	−0.65	−0.58	[−2.67, 0.98]	1.33	1.31	[0.29, 2.42]	−0.24	−0.24	[−0.56, 0.08]
27	Tabasco	−0.25	−0.24	[−2.22, 1.47]	1.85	1.84	[1.13, 2.65]	−0.55	−0.55	[−0.82, −0.28]
28	Tamaulipas	−1.25	−1.27	[−2.97, 0.42]	1.01	1.02	[0.09, 1.90]	−0.01	−0.02	[−0.37, 0.36]
29	Tlaxcala	−0.99	−1.00	[−2.60, 0.46]	0.99	1.00	[0.11, 1.83]	0.11	0.11	[−0.27, 0.50]
30	Veracruz	−0.27	−0.14	[−2.04, 0.86]	0.98	0.92	[0.20, 2.13]	−0.10	−0.10	[−0.44, 0.23]
31	Yucatán	−0.41	−0.40	[−1.88, 0.90]	1.38	1.38	[0.55, 2.27]	−0.14	−0.15	[−0.50, 0.22]
32	Zacatecas	−0.15	−0.05	[−2.12, 1.32]	1.52	1.48	[0.65, 2.61]	−0.40	−0.40	[−0.70, −0.10]

Notes: 95% CI indicates 95% credible interval.

Table 3: Estimated Parameters (Continued)

		σ^2			p_{11}			p_{00}		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	3.69	3.50	[1.95, 6.52]	0.92	0.94	[0.73, 1.00]	0.75	0.77	[0.48, 0.95]
2	Baja California	2.37	2.20	[1.34, 4.40]	0.94	0.95	[0.81, 0.99]	0.77	0.79	[0.52, 0.95]
3	Baja California Sur	3.97	3.83	[2.38, 6.35]	0.93	0.95	[0.73, 1.00]	0.78	0.80	[0.49, 0.97]
4	Campeche	4.52	4.37	[2.72, 7.20]	0.87	0.89	[0.62, 0.99]	0.84	0.87	[0.57, 0.98]
5	Coahuila	16.15	15.56	[10.04, 25.45]	0.90	0.93	[0.68, 1.00]	0.78	0.80	[0.50, 0.97]
6	Colima	7.21	6.99	[4.28, 11.40]	0.91	0.93	[0.69, 1.00]	0.78	0.80	[0.50, 0.97]
7	Chiapas	9.28	9.01	[5.53, 14.67]	0.90	0.93	[0.67, 1.00]	0.78	0.79	[0.50, 0.97]
8	Chihuahua	5.33	5.16	[2.32, 9.30]	0.91	0.93	[0.73, 0.99]	0.76	0.77	[0.48, 0.96]
9	Distrito Federal	1.60	1.50	[0.93, 2.81]	0.94	0.95	[0.82, 0.99]	0.76	0.78	[0.49, 0.95]
10	Durango	1.68	1.63	[0.93, 2.74]	0.91	0.93	[0.69, 1.00]	0.78	0.79	[0.50, 0.97]
11	Guanajuato	5.03	4.84	[2.84, 8.40]	0.91	0.93	[0.71, 1.00]	0.78	0.79	[0.51, 0.96]
12	Guerrero	1.74	1.65	[0.98, 2.98]	0.92	0.93	[0.73, 0.99]	0.78	0.80	[0.53, 0.96]
13	Hidalgo	4.62	4.33	[2.52, 8.25]	0.94	0.95	[0.80, 0.99]	0.77	0.78	[0.50, 0.95]
14	Jalisco	3.65	3.50	[1.94, 6.31]	0.93	0.94	[0.75, 1.00]	0.75	0.77	[0.47, 0.95]
15	México	1.96	1.84	[1.02, 3.57]	0.93	0.94	[0.78, 0.99]	0.74	0.75	[0.46, 0.94]
16	Michoacán	3.13	2.99	[1.66, 5.37]	0.92	0.94	[0.73, 1.00]	0.75	0.76	[0.47, 0.95]
17	Morelos	2.25	2.16	[1.31, 3.78]	0.92	0.94	[0.75, 1.00]	0.79	0.81	[0.54, 0.96]
18	Nayarit	12.62	12.17	[7.88, 19.93]	0.91	0.93	[0.68, 1.00]	0.79	0.81	[0.51, 0.97]
19	Nuevo León	4.23	3.99	[2.39, 7.51]	0.94	0.95	[0.81, 0.99]	0.76	0.77	[0.49, 0.95]
20	Oaxaca	2.48	2.40	[1.44, 4.03]	0.91	0.93	[0.67, 1.00]	0.78	0.79	[0.49, 0.97]
21	Puebla	7.34	7.06	[4.33, 11.92]	0.92	0.94	[0.73, 1.00]	0.77	0.79	[0.49, 0.96]
22	Querétaro	3.34	3.12	[1.92, 5.93]	0.94	0.95	[0.83, 0.99]	0.77	0.79	[0.51, 0.95]
23	Quintana Roo	10.46	10.32	[4.18, 17.97]	0.91	0.92	[0.71, 1.00]	0.76	0.78	[0.48, 0.96]
24	San Luis Potosí	4.14	3.94	[2.07, 7.30]	0.92	0.94	[0.75, 0.99]	0.75	0.76	[0.48, 0.95]
25	Sinaloa	6.92	6.69	[4.18, 10.94]	0.90	0.93	[0.68, 1.00]	0.78	0.80	[0.49, 0.96]
26	Sonora	7.17	6.90	[4.22, 11.68]	0.92	0.94	[0.72, 1.00]	0.77	0.79	[0.50, 0.96]
27	Tabasco	2.99	2.90	[1.61, 4.88]	0.94	0.96	[0.77, 1.00]	0.75	0.77	[0.45, 0.96]
28	Tamaulipas	3.92	3.73	[2.18, 6.72]	0.91	0.93	[0.72, 0.99]	0.78	0.80	[0.52, 0.96]
29	Tlaxcala	2.61	2.48	[1.29, 4.70]	0.89	0.90	[0.68, 0.99]	0.76	0.77	[0.50, 0.96]
30	Veracruz	3.56	3.43	[2.21, 5.67]	0.91	0.94	[0.69, 1.00]	0.79	0.82	[0.50, 0.97]
31	Yucatán	2.44	2.33	[1.41, 4.07]	0.92	0.94	[0.73, 1.00]	0.79	0.81	[0.54, 0.96]
32	Zacatecas	5.00	4.83	[3.01, 7.97]	0.92	0.95	[0.69, 1.00]	0.77	0.79	[0.47, 0.96]

Notes: 95% CI indicates 95% credible interval.

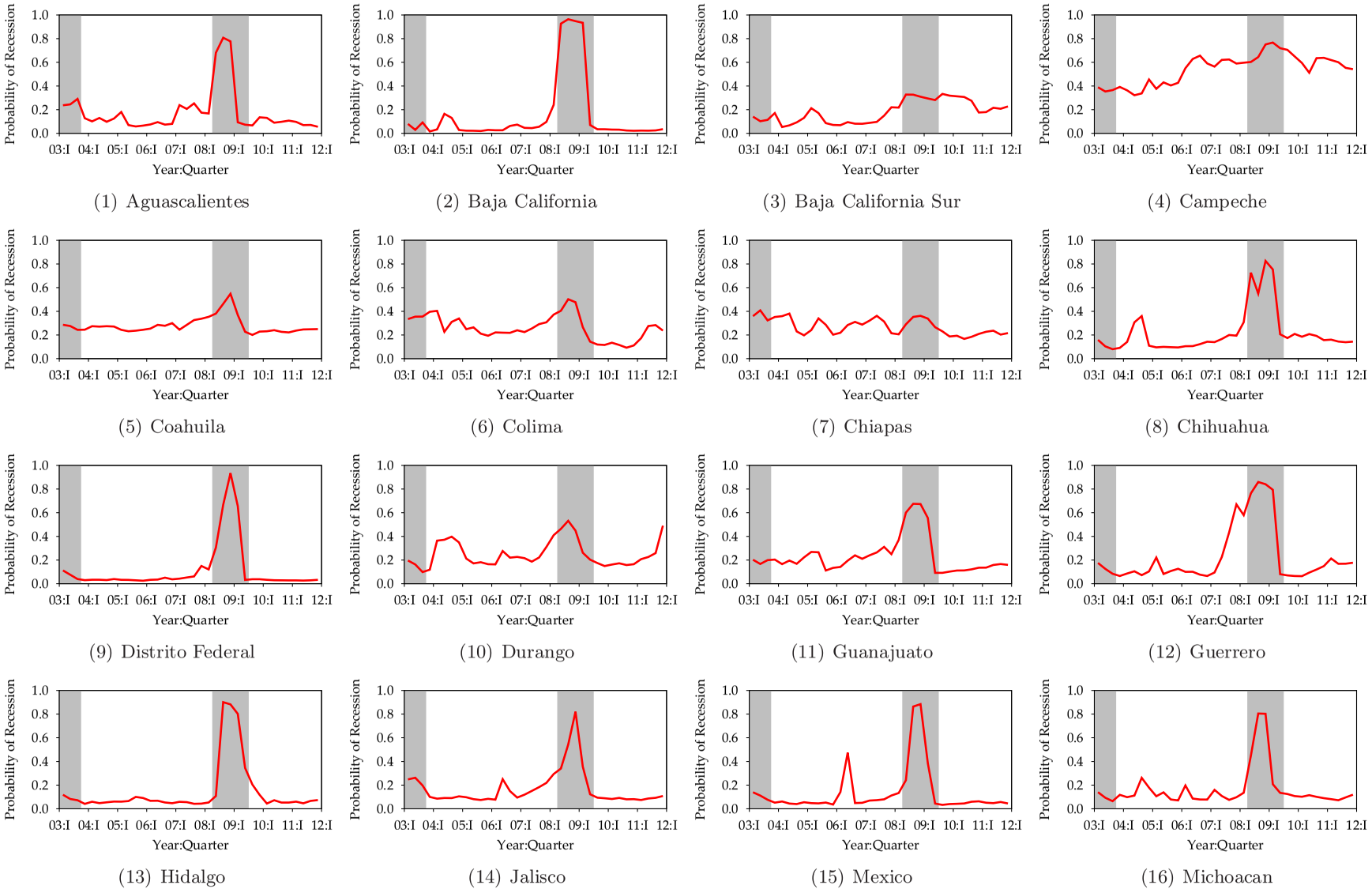
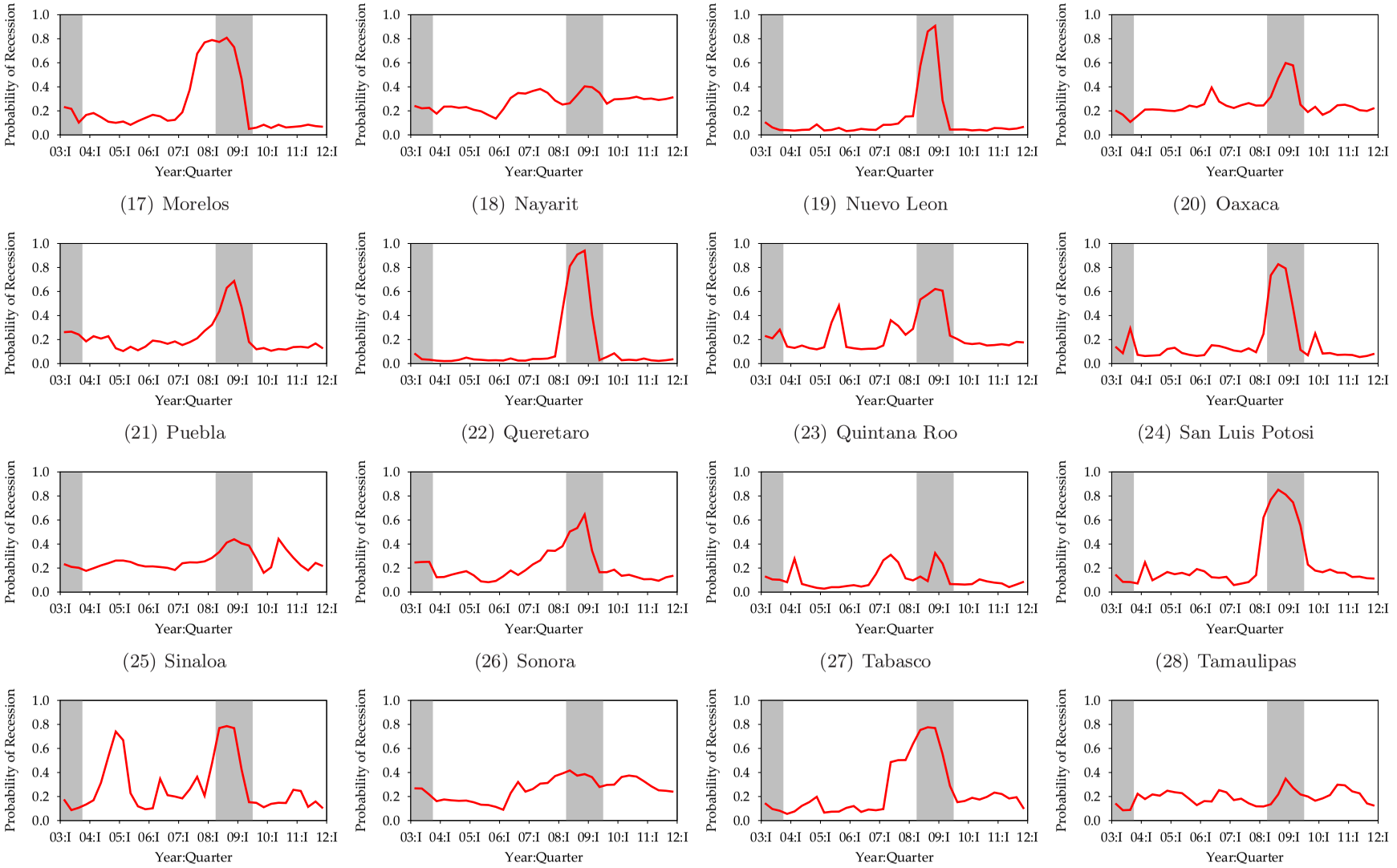


Figure 8: Recession Probabilities



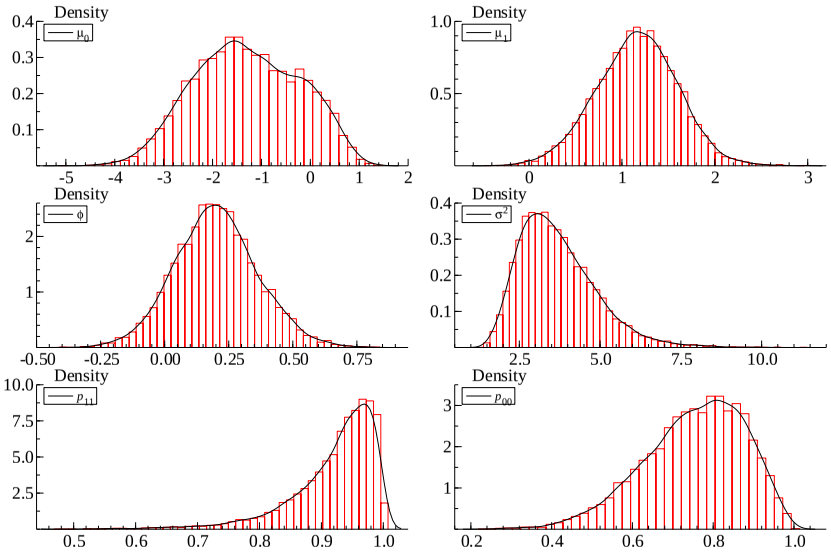
(17) Morelos (18) Nayarit (19) Nuevo Leon (20) Oaxaca

(21) Puebla (22) Queretaro (23) Quintana Roo (24) San Luis Potosi

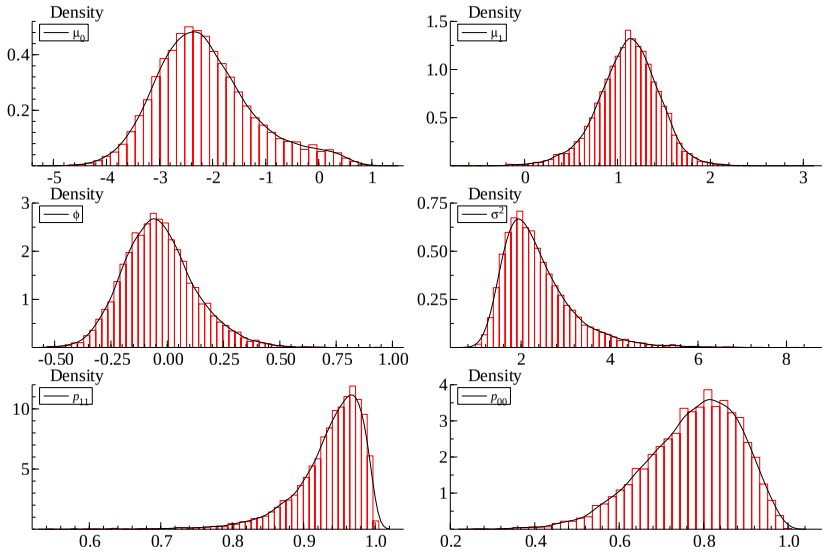
(25) Sinaloa (26) Sonora (27) Tabasco (28) Tamaulipas

(29) Tlaxcala (30) Veracruz (31) Yucatan (32) Zacatecas

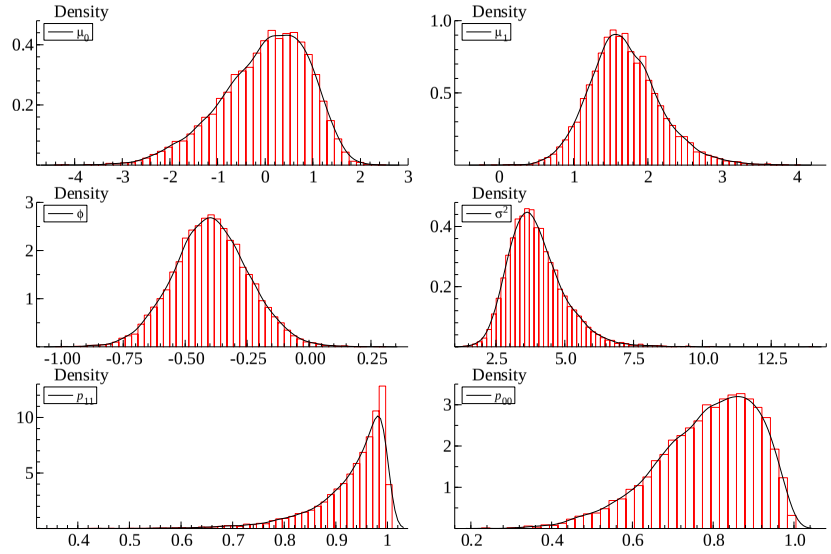
Figure 8: Recession Probabilities (Continued)



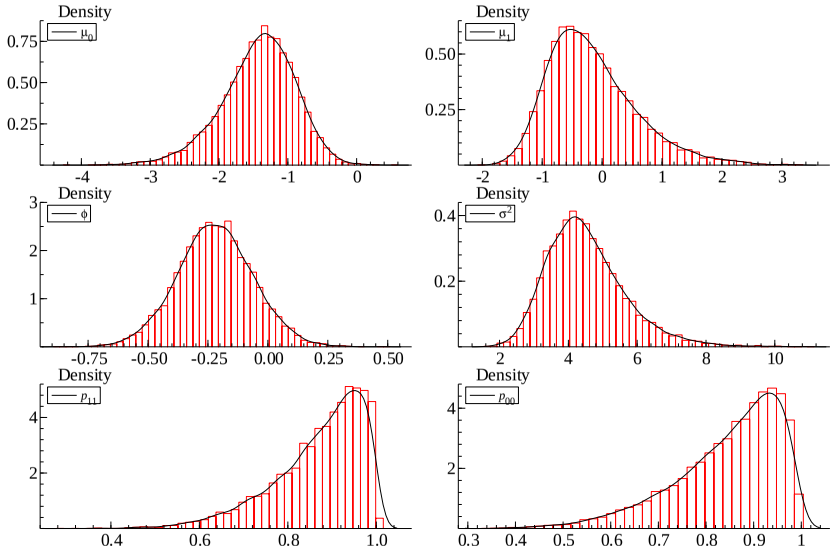
(1) Aguascalientes



(2) Baja California

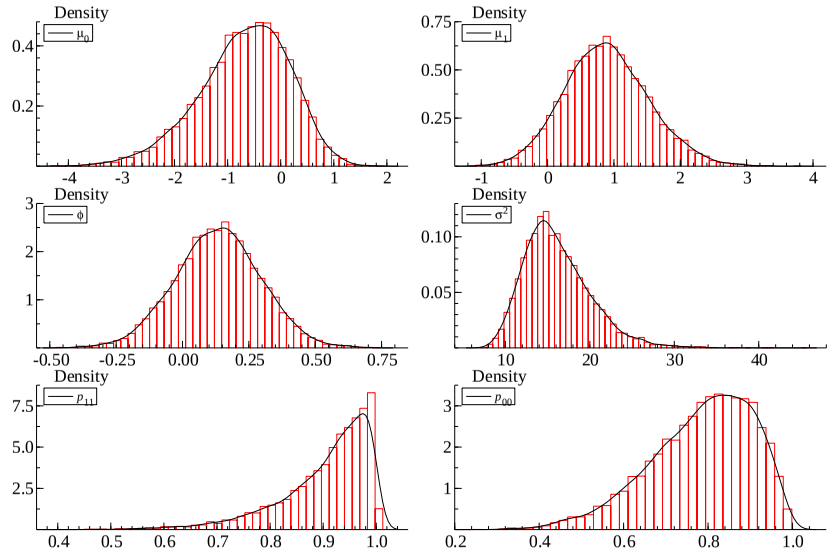


(3) Baja California Sur

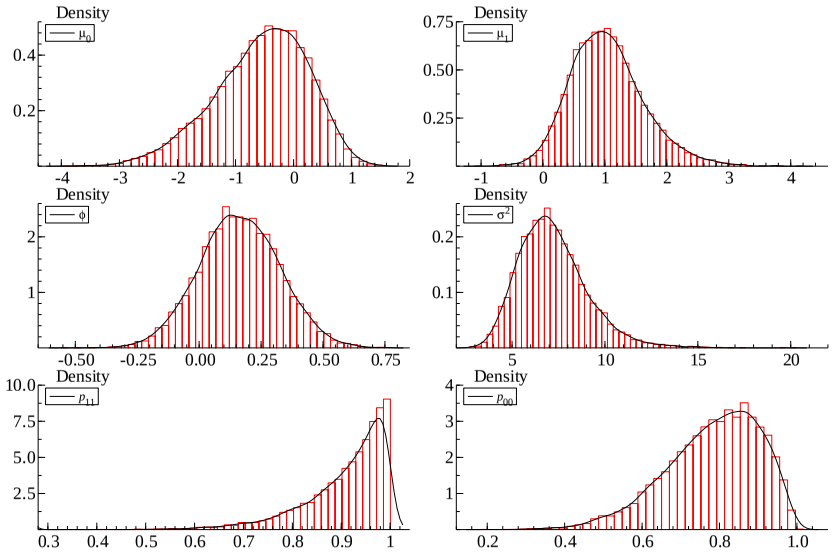


(4) Campeche

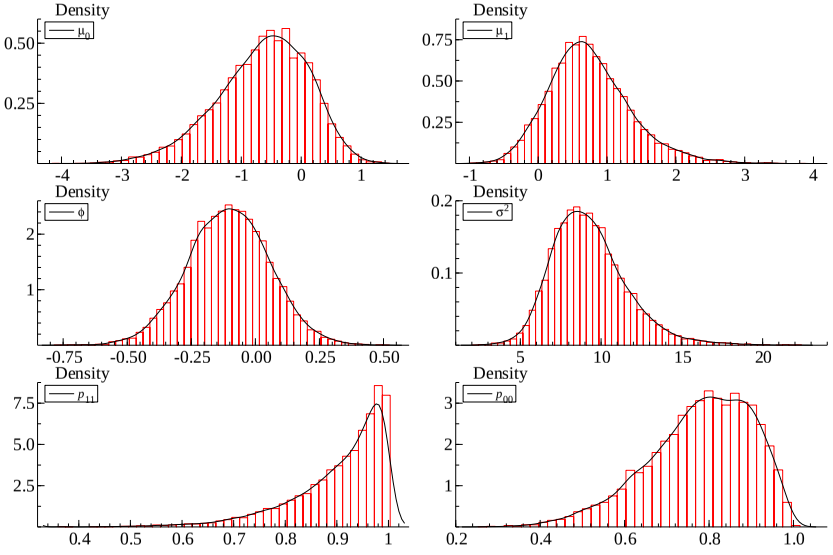
Figure 9: Posterior Distributions



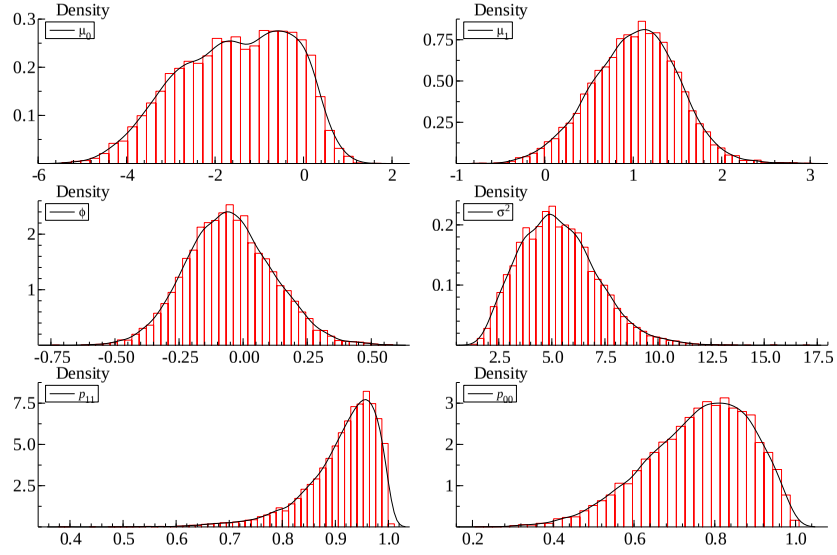
(5) Coahuila



(6) Colima

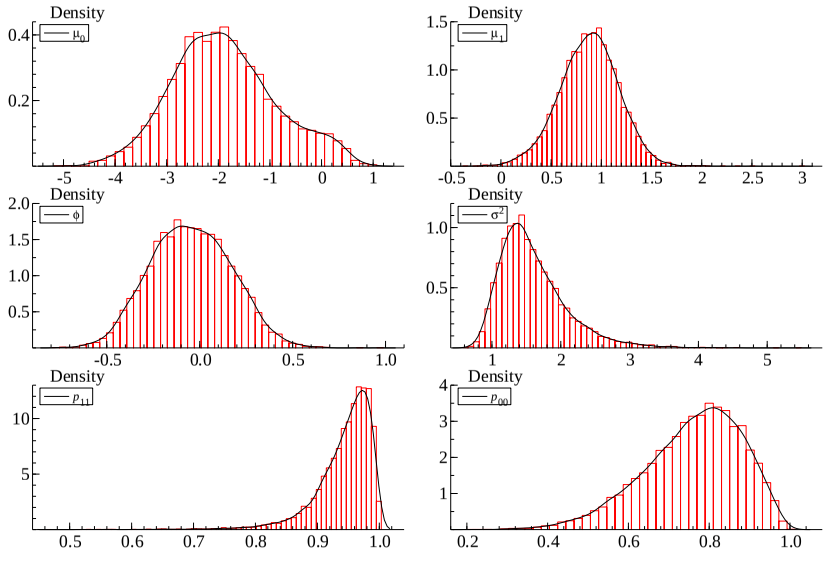


(7) Chiapas

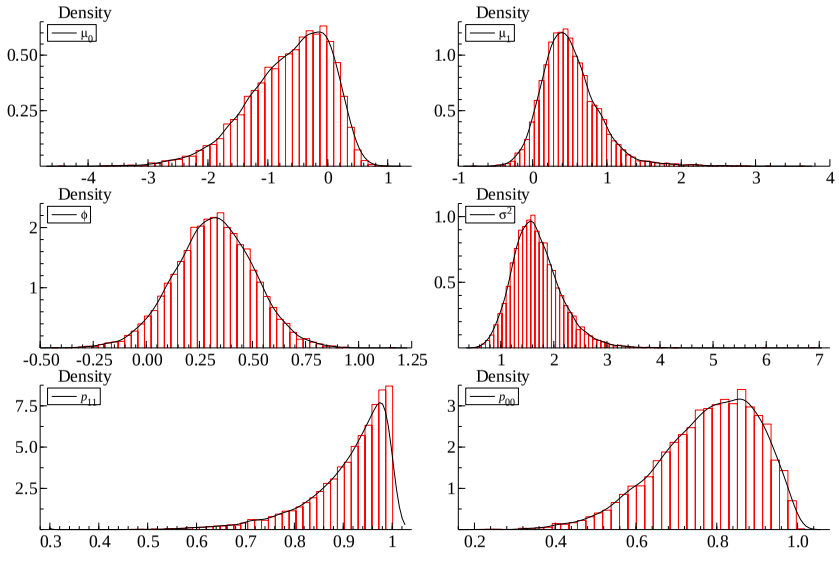


(8) Chihuahua

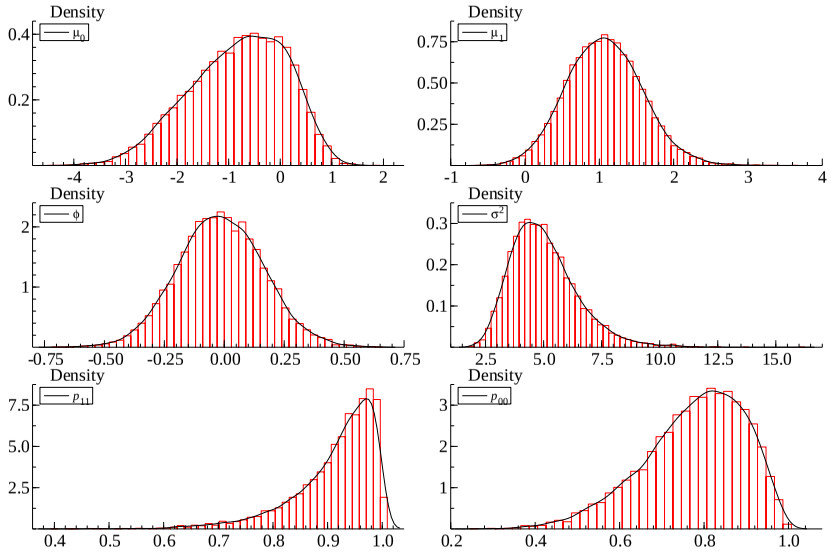
Figure 9: Posterior Distributions (Continued)



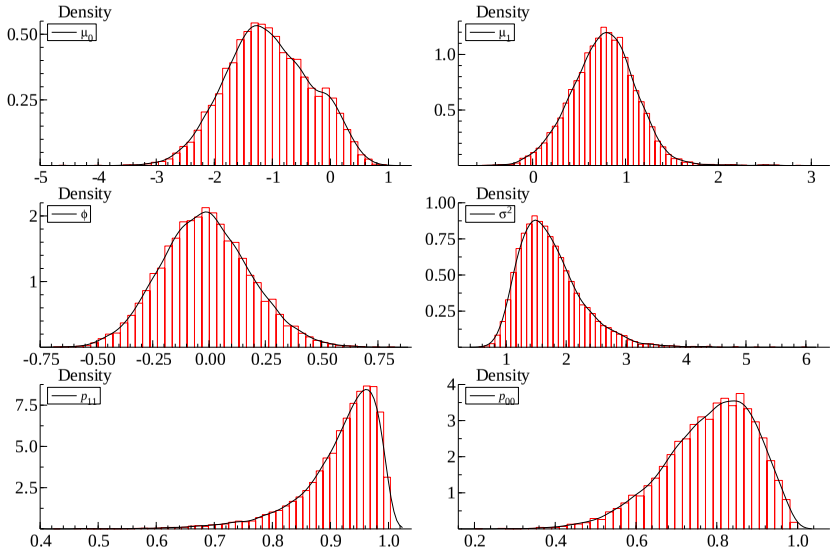
(9) Distrito Federal



(10) Durango

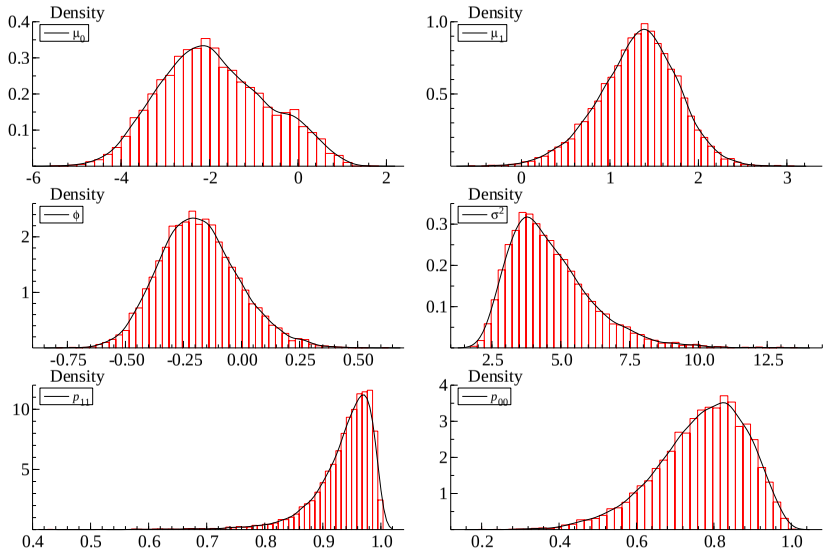


(11) Guanajuato

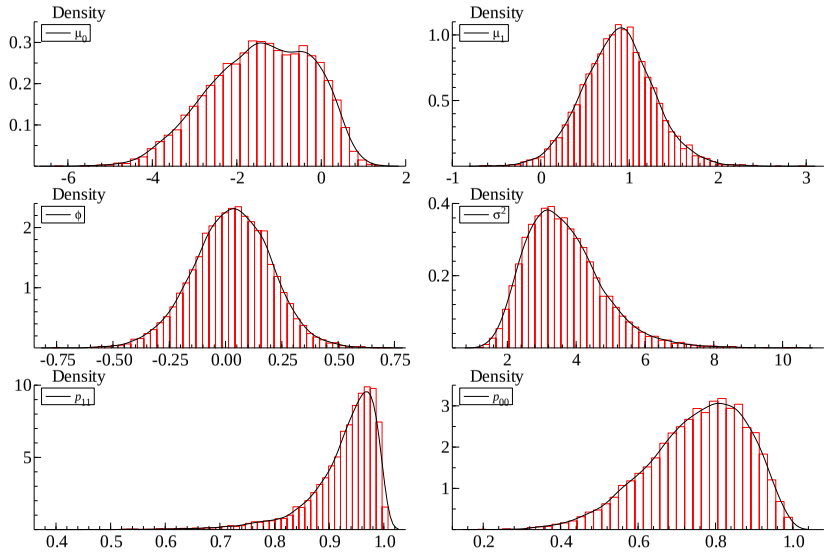


(12) Guerrero

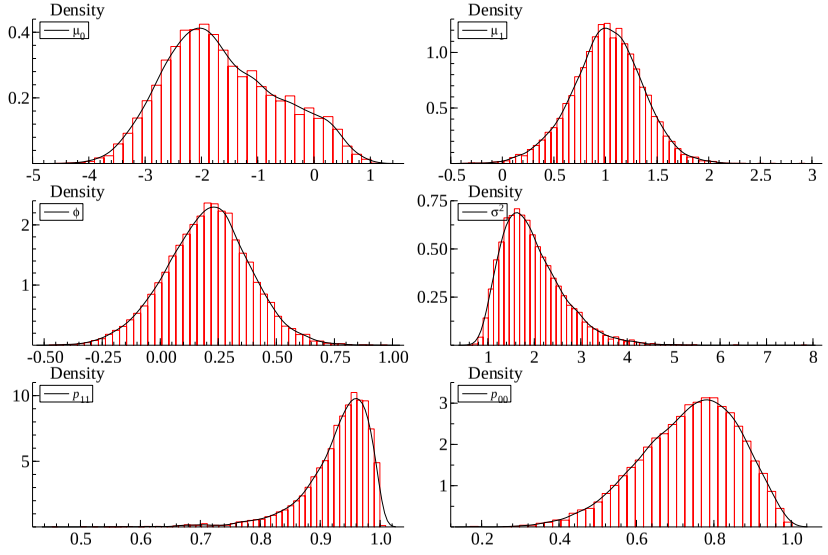
Figure 9: Posterior Distributions (Continued)



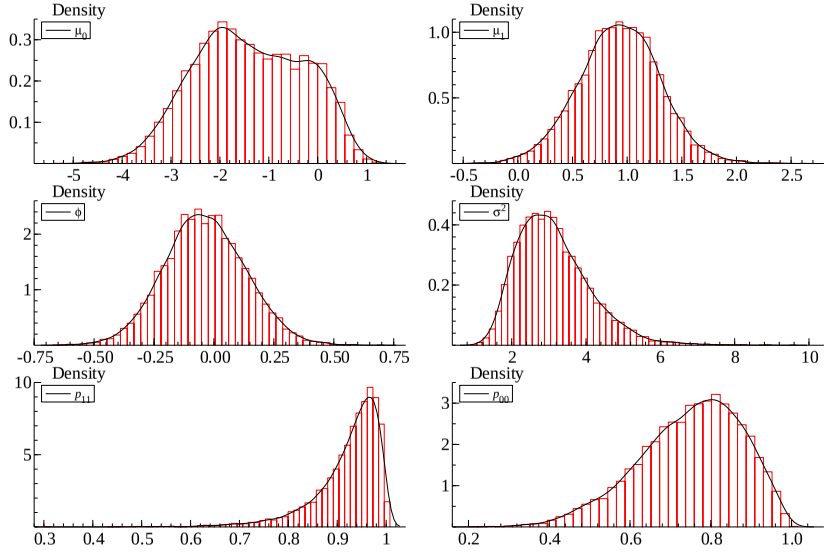
(13) Hidalgo



(14) Jalisco

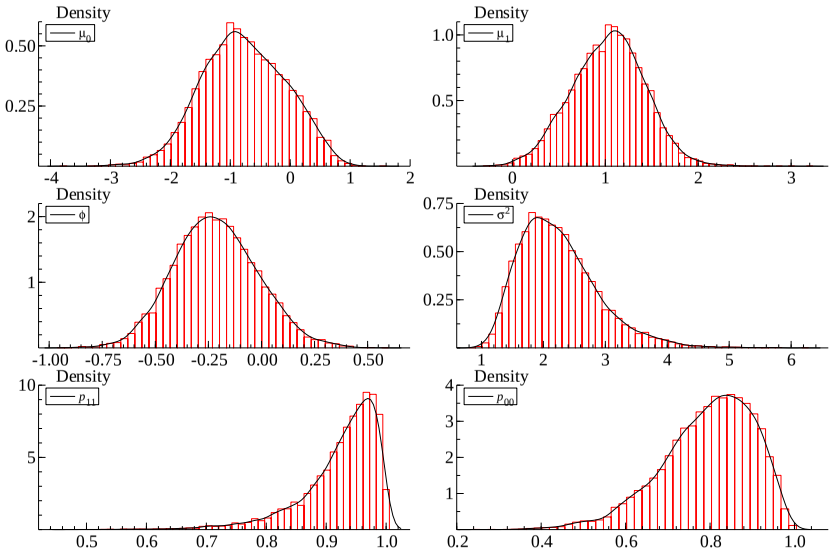


(15) Mexico

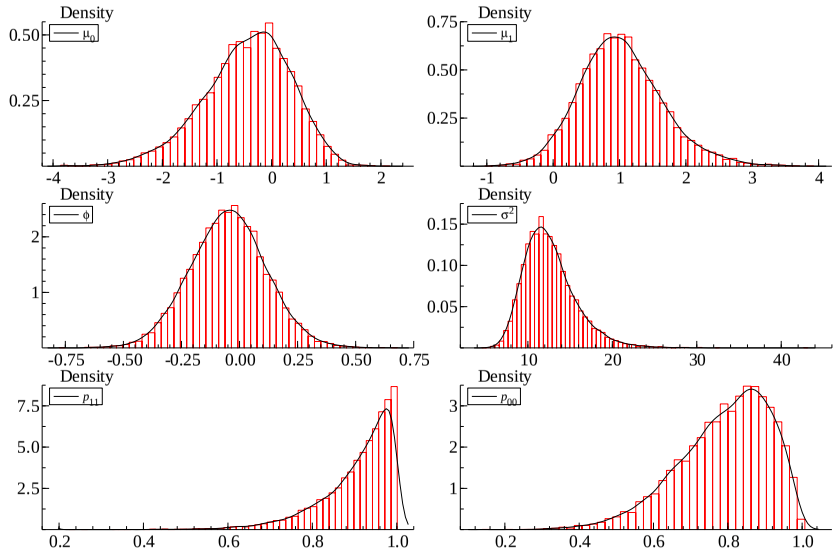


(16) Michoacan

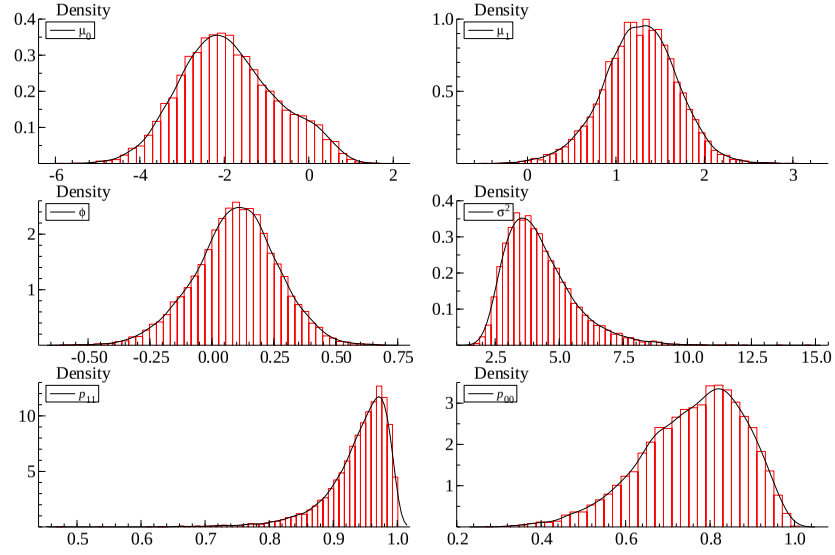
Figure 9: Posterior Distributions (Continued)



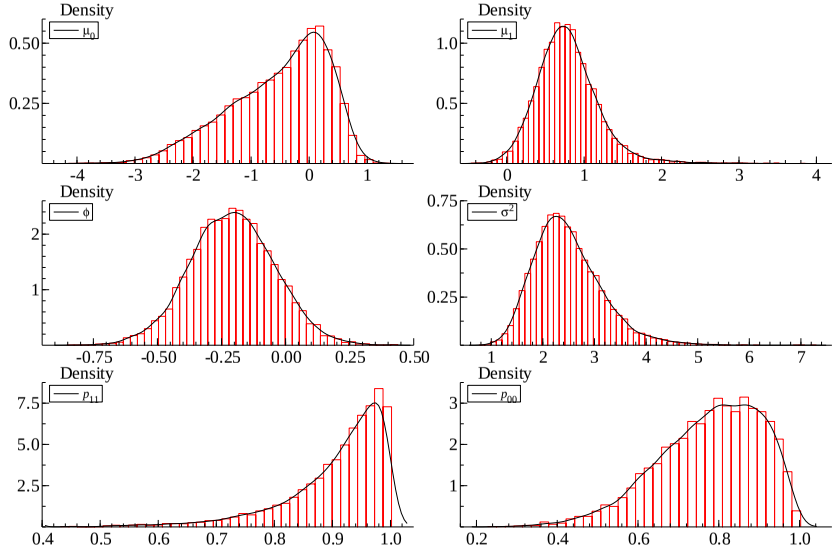
(17) Morelos



(18) Nayarit

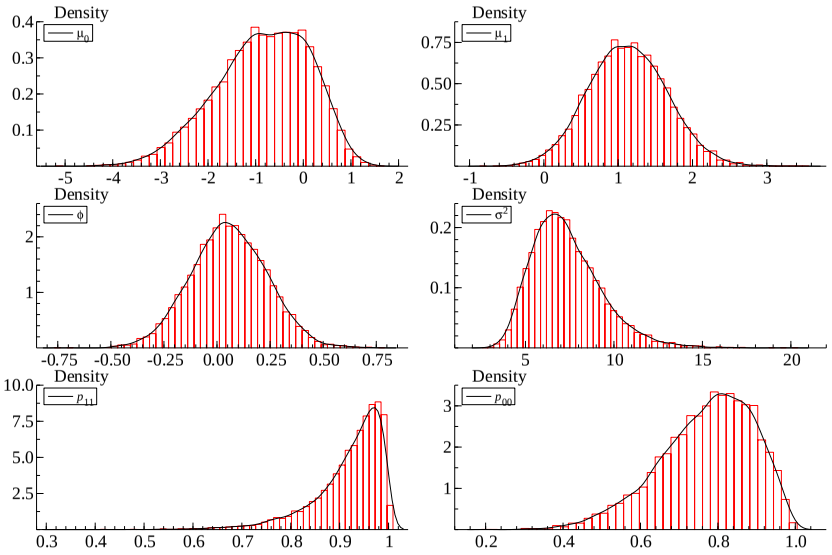


(19) Nuevo Leon

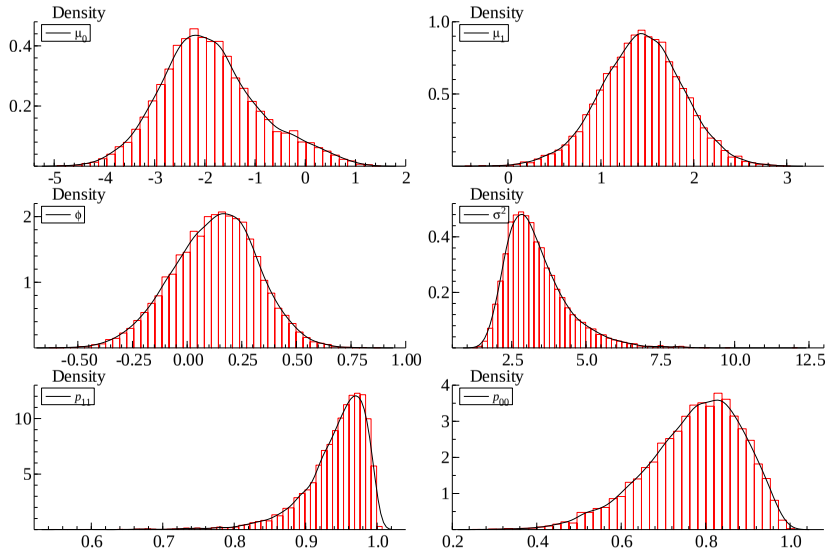


(20) Oaxaca

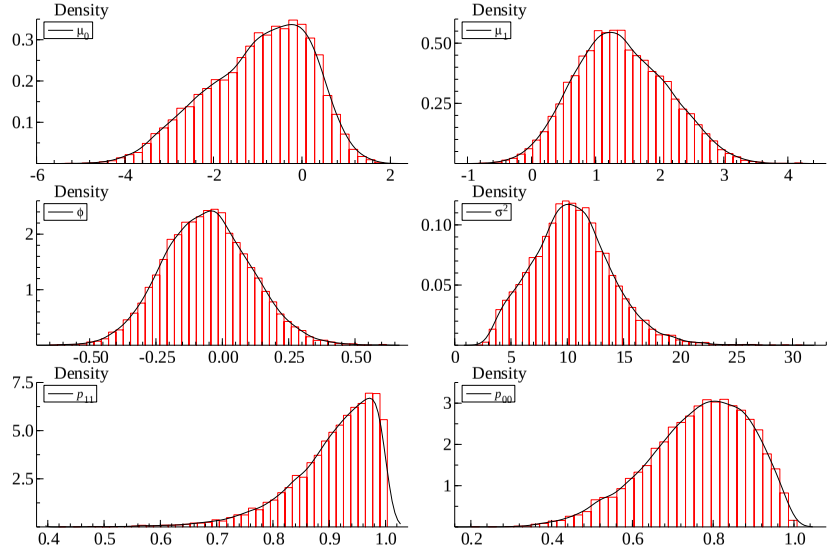
Figure 9: Posterior Distributions (Continued)



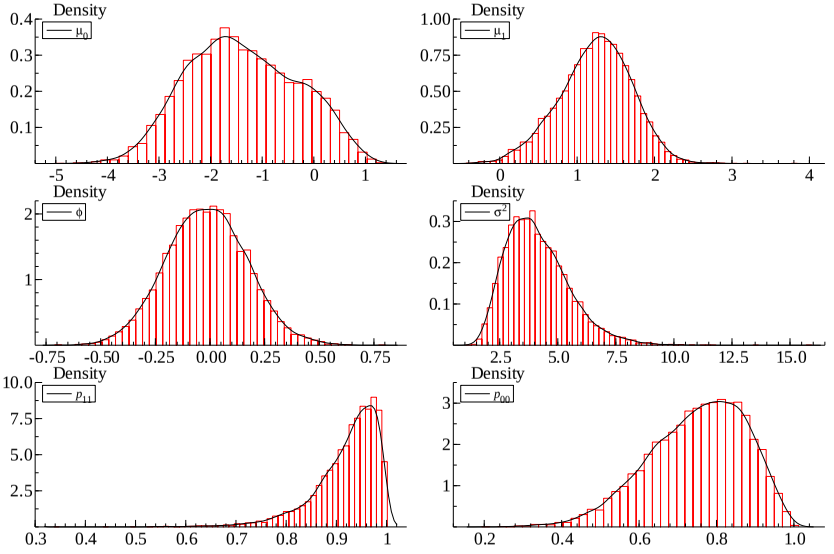
(21) Puebla



(22) Queretaro

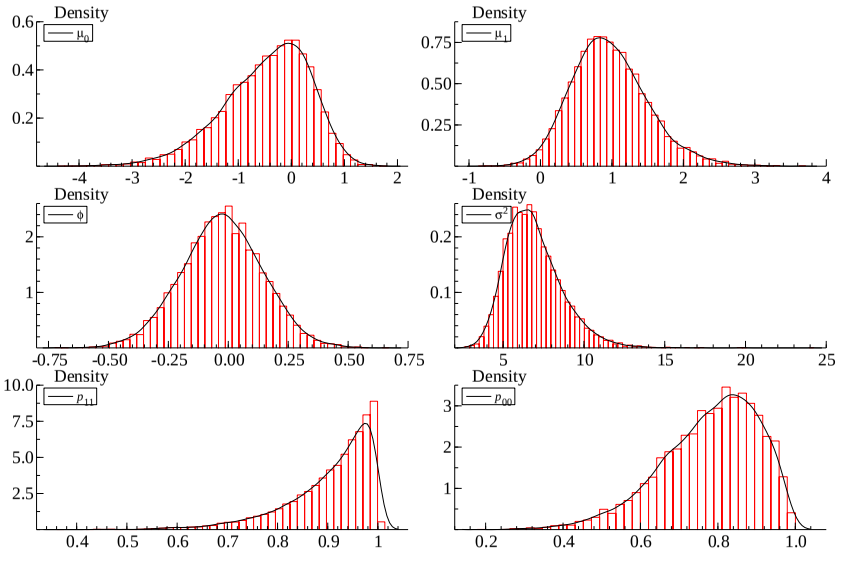


(23) Quintana Roo

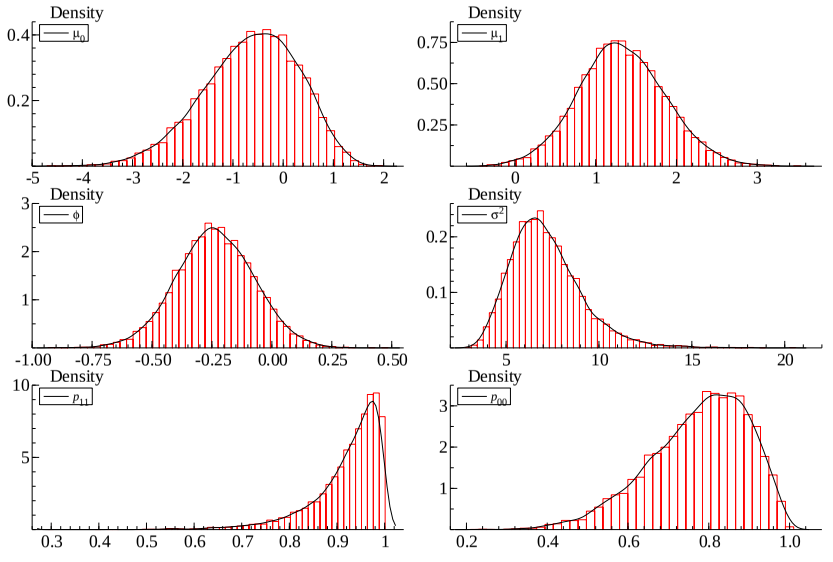


(24) San Luis Potosi

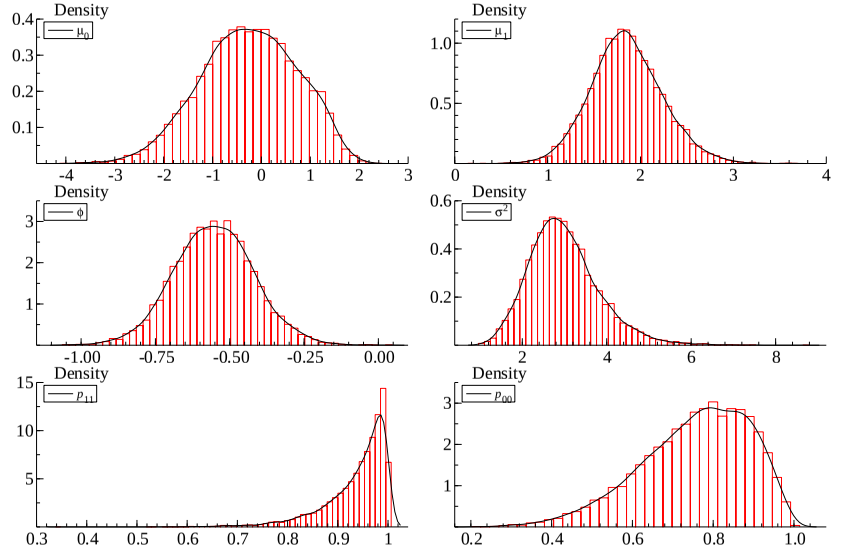
Figure 9: Posterior Distributions (Continued)



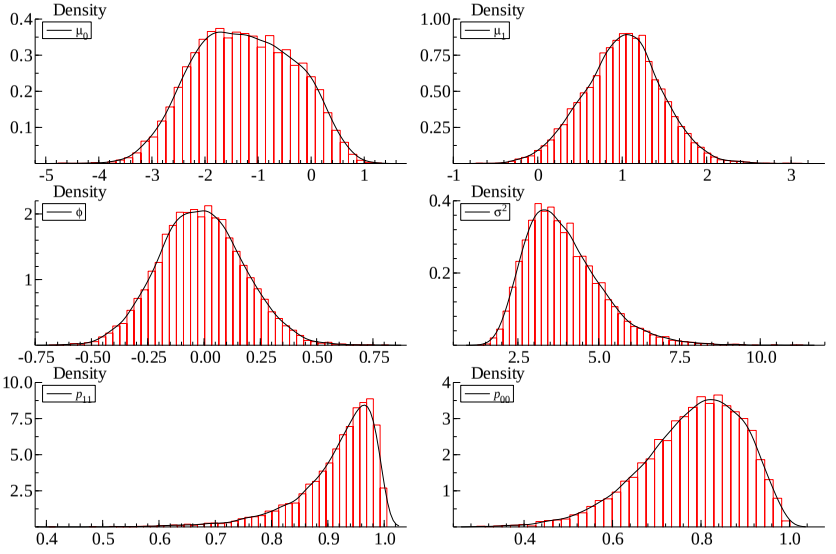
(25) Sinaloa



(26) Sonora

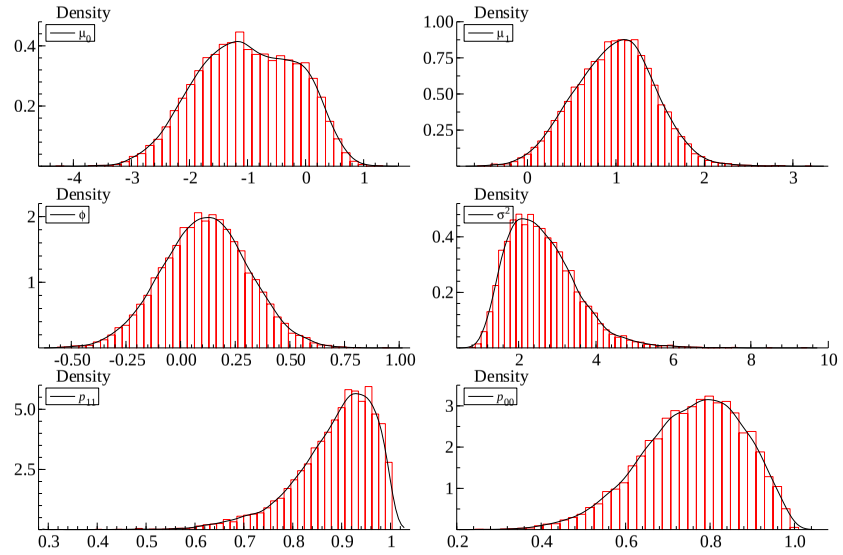


(27) Tabasco

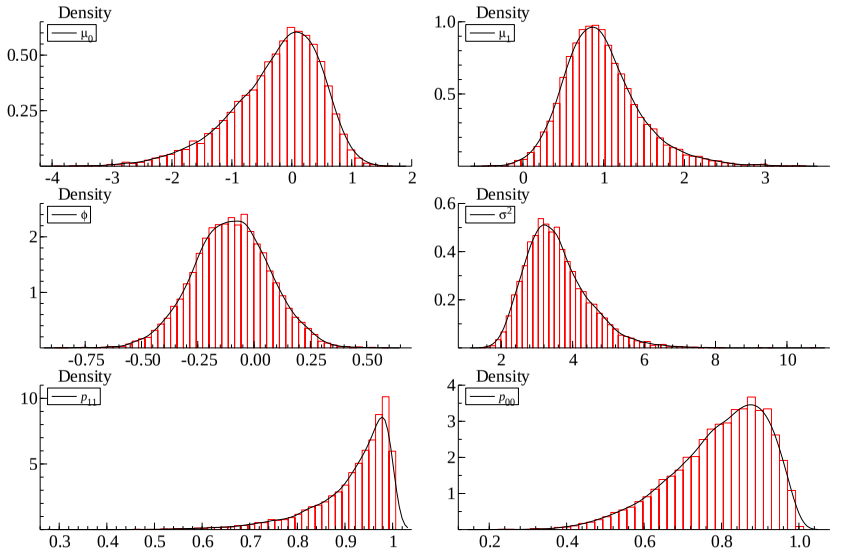


(28) Tamaulipas

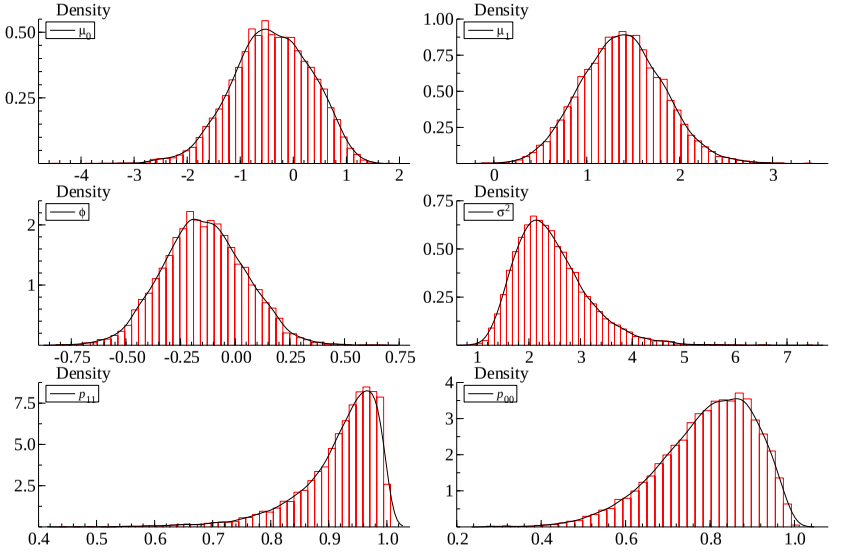
Figure 9: Posterior Distributions (Continued)



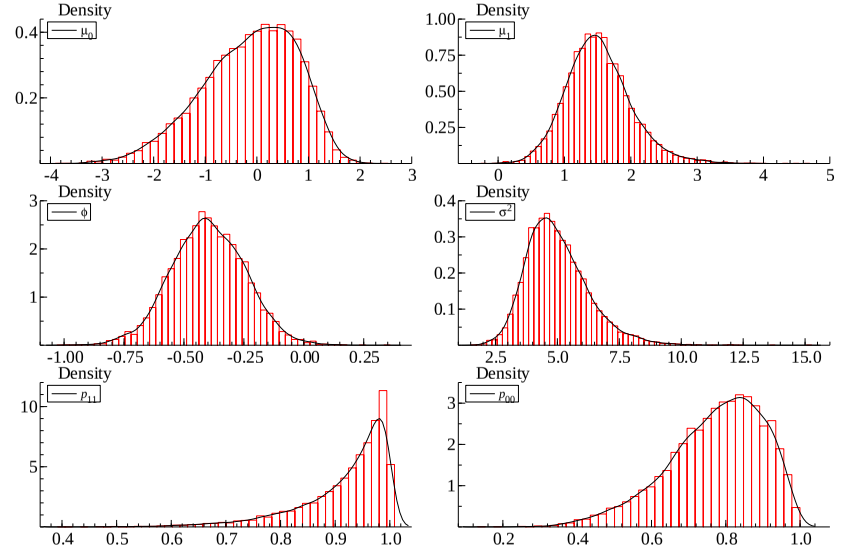
(29) Tlaxcala



(30) Veracruz



(31) Yucatan



(32) Zacatecas

Figure 9: Posterior Distributions (Continued)

5 Estimation Results of Markov Switching Model with Spatial Autoregressive and First-Order Autoregressive Processes (Distance-Based SWM, $\eta = 4$)

The estimation results here are obtained by estimating the standard Markov switching model:

$$\boldsymbol{y}_t = \rho \boldsymbol{W} \boldsymbol{y}_t + \boldsymbol{\Phi} \boldsymbol{y}_{t-1} + \boldsymbol{\mu}_0 \odot (\boldsymbol{\iota}_N - \boldsymbol{s}_t) + \boldsymbol{\mu}_1 \odot \boldsymbol{s}_t + \boldsymbol{\varepsilon}_t,$$

where $\boldsymbol{\Phi} = \mathrm{diag}(\phi_1, \ldots, \phi_N)$, $\boldsymbol{\varepsilon}_t \sim$ i.i.d. $\mathrm{N}(\boldsymbol{0}, \boldsymbol{\Omega})$, and $\boldsymbol{\Omega} = \mathrm{diag}(\sigma_1^2, \ldots, \sigma_N^2)$.

Table 4

Table 4 shows the point estimates and interval estimates of parameters.

Figure 10

Figure 10 shows the probabilities of recession, which are calculated by $1 - G^{-1} \sum_{g=1}^{G} s_{t,n}^{(g)}$, where G is the number of iterations and the superscript (g) is the gth iteration.

Figure 11

Figure 11 shows the posterior distributions of parameters by state. The solid line indicates density estimates obtained by kernel density estimation.

Figure 12

Figure 12 shows the posterior distribution of ρ. The solid line indicates density estimates obtained by kernel density estimation.

Table 4: Estimated Parameters

		ρ		
		Mean	Median	95% CI
	Spatial Dependence	0.29	0.29	[0.24, 0.33]

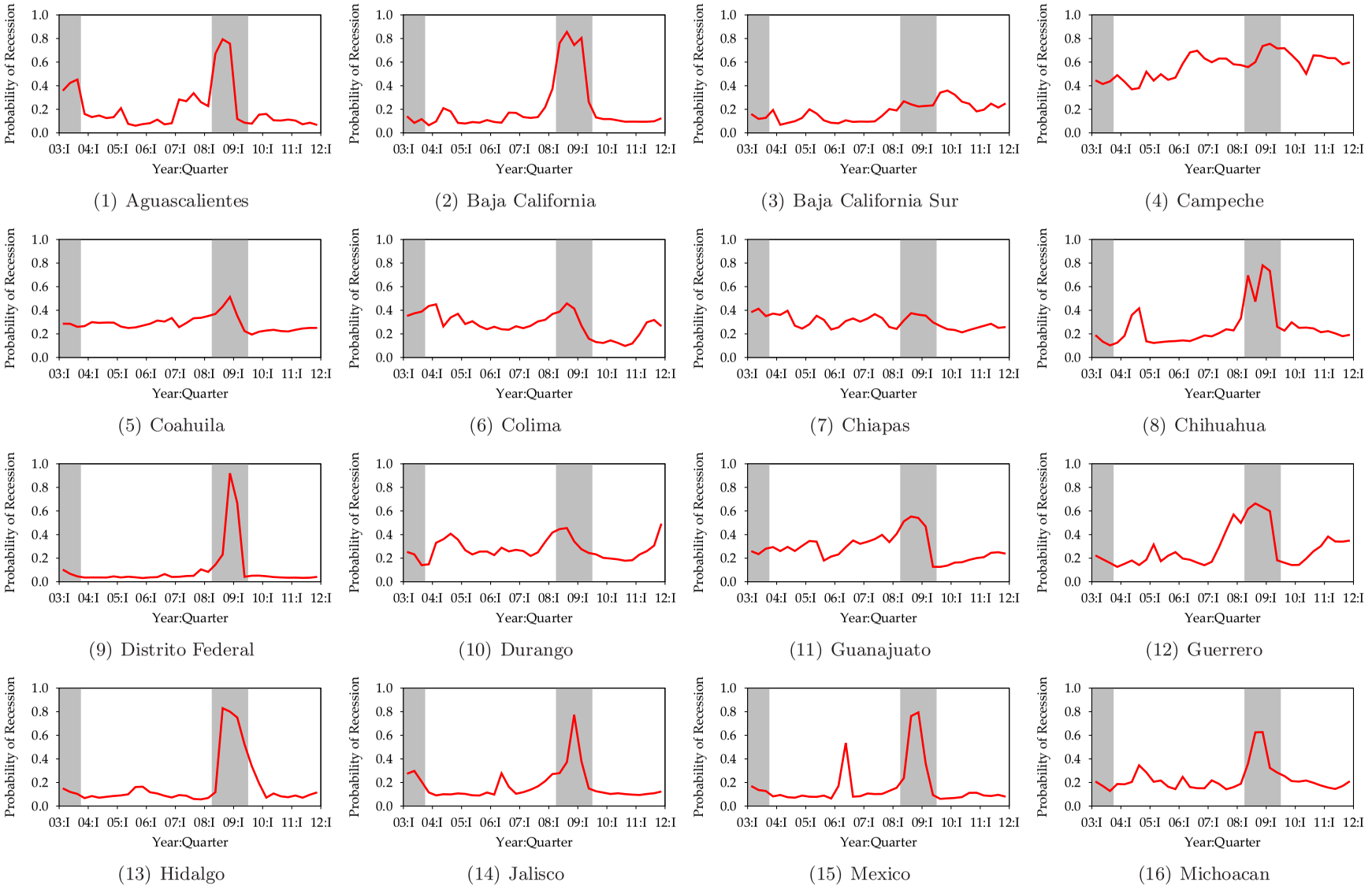
		μ_0			μ_1			ϕ		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	−1.16	−1.15	[−3.03, 0.54]	1.03	1.02	[0.18, 1.91]	0.10	0.10	[−0.20, 0.41]
2	Baja California	−1.41	−1.46	[−3.23, 0.32]	0.77	0.77	[0.01, 1.50]	−0.03	−0.03	[−0.36, 0.32]
3	Baja California Sur	−0.13	−0.02	[−2.10, 1.30]	1.49	1.46	[0.68, 2.49]	−0.40	−0.40	[−0.70, −0.09]
4	Campeche	−1.61	−1.56	[−2.76, −0.73]	−0.31	−0.46	[−1.49, 1.64]	−0.19	−0.19	[−0.48, 0.11]
5	Coahuila	−0.71	−0.62	[−2.54, 0.65]	0.69	0.65	[−0.40, 1.96]	0.11	0.11	[−0.17, 0.40]
6	Colima	−0.52	−0.44	[−2.20, 0.73]	0.94	0.88	[−0.06, 2.30]	0.09	0.09	[−0.20, 0.39]
7	Chiapas	−0.73	−0.65	[−2.35, 0.51]	0.54	0.48	[−0.52, 1.93]	−0.15	−0.14	[−0.47, 0.18]
8	Chihuahua	−1.38	−1.16	[−3.92, 0.43]	0.79	0.79	[−0.13, 1.72]	−0.05	−0.05	[−0.34, 0.26]
9	Distrito Federal	−2.06	−2.21	[−3.87, 0.23]	0.65	0.66	[0.14, 1.13]	−0.11	−0.12	[−0.47, 0.27]
10	Durango	−0.68	−0.54	[−2.25, 0.23]	0.34	0.28	[−0.26, 1.40]	0.16	0.16	[−0.20, 0.51]
11	Guanajuato	−0.54	−0.43	[−2.24, 0.61]	0.81	0.75	[−0.04, 2.04]	−0.03	−0.03	[−0.33, 0.26]
12	Guerrero	−0.67	−0.59	[−2.05, 0.28]	0.48	0.45	[−0.12, 1.28]	0.02	0.03	[−0.31, 0.36]
13	Hidalgo	−1.49	−1.55	[−3.52, 0.54]	1.13	1.15	[0.19, 2.00]	−0.20	−0.21	[−0.52, 0.15]
14	Jalisco	−1.39	−1.26	[−3.79, 0.40]	0.63	0.62	[−0.06, 1.37]	−0.01	−0.01	[−0.33, 0.28]
15	México	−1.24	−1.32	[−2.95, 0.47]	0.81	0.81	[0.15, 1.46]	0.20	0.20	[−0.13, 0.51]
16	Michoacán	−0.80	−0.65	[−2.81, 0.55]	0.68	0.66	[−0.02, 1.47]	−0.14	−0.14	[−0.45, 0.16]
17	Morelos	−0.63	−0.60	[−1.97, 0.50]	0.78	0.77	[0.10, 1.53]	−0.27	−0.27	[−0.60, 0.06]
18	Nayarit	−0.51	−0.44	[−2.23, 0.80]	0.90	0.86	[−0.20, 2.24]	−0.06	−0.06	[−0.37, 0.26]
19	Nuevo León	−1.36	−1.43	[−3.15, 0.58]	1.22	1.23	[0.48, 1.93]	−0.10	−0.09	[−0.40, 0.19]
20	Oaxaca	−0.40	−0.23	[−2.13, 0.55]	0.61	0.54	[−0.03, 1.77]	−0.22	−0.22	[−0.51, 0.07]
21	Puebla	−0.70	−0.59	[−2.71, 0.75]	0.98	0.95	[0.00, 2.07]	0.03	0.03	[−0.31, 0.37]
22	Querétaro	−1.78	−1.85	[−3.44, 0.28]	1.26	1.26	[0.46, 2.02]	0.06	0.07	[−0.28, 0.38]
23	Quintana Roo	−0.91	−0.79	[−3.24, 0.89]	1.38	1.34	[0.12, 2.75]	−0.05	−0.05	[−0.34, 0.27]
24	San Luis Potosí	−1.17	−1.19	[−2.98, 0.57]	1.03	1.04	[0.19, 1.82]	−0.10	−0.10	[−0.41, 0.23]
25	Sinaloa	−0.52	−0.41	[−2.31, 0.72]	0.82	0.78	[−0.09, 2.04]	−0.06	−0.06	[−0.39, 0.27]
26	Sonora	−0.61	−0.52	[−2.60, 0.88]	1.16	1.14	[0.21, 2.20]	−0.27	−0.27	[−0.56, 0.02]
27	Tabasco	−0.14	−0.09	[−2.18, 1.55]	1.78	1.77	[1.05, 2.54]	−0.65	−0.65	[−0.94, −0.36]
28	Tamaulipas	−0.90	−0.80	[−2.53, 0.39]	0.85	0.81	[−0.11, 2.16]	−0.08	−0.08	[−0.42, 0.26]
29	Tlaxcala	−0.77	−0.62	[−2.65, 0.42]	0.61	0.56	[−0.14, 1.69]	0.12	0.12	[−0.21, 0.45]
30	Veracruz	−0.35	−0.21	[−2.07, 0.73]	0.82	0.76	[0.04, 1.96]	−0.11	−0.12	[−0.44, 0.22]
31	Yucatán	−0.16	−0.09	[−1.92, 1.12]	1.46	1.43	[0.71, 2.39]	−0.08	−0.08	[−0.41, 0.26]
32	Zacatecas	−0.20	−0.09	[−2.09, 1.16]	1.30	1.25	[0.43, 2.52]	−0.38	−0.38	[−0.67, −0.08]

Notes: 95% CI indicates 95% credible interval.

Table 4: Estimated Parameters (Continued)

		σ^2			p_{11}			p_{00}		
Code	State	Mean	Median	95% CI	Mean	Median	95% CI	Mean	Median	95% CI
1	Aguascalientes	3.31	3.15	[1.72, 5.74]	0.91	0.93	[0.71, 0.99]	0.75	0.77	[0.48, 0.95]
2	Baja California	2.72	2.60	[1.50, 4.64]	0.92	0.94	[0.74, 0.99]	0.77	0.79	[0.50, 0.96]
3	Baja California Sur	4.22	4.07	[2.56, 6.70]	0.93	0.95	[0.73, 1.00]	0.78	0.80	[0.50, 0.97]
4	Campeche	4.12	3.98	[2.42, 6.66]	0.86	0.88	[0.59, 0.99]	0.84	0.87	[0.55, 0.98]
5	Coahuila	12.99	12.52	[8.08, 20.40]	0.90	0.93	[0.68, 1.00]	0.79	0.81	[0.50, 0.97]
6	Colima	6.55	6.34	[3.95, 10.30]	0.90	0.93	[0.67, 1.00]	0.79	0.80	[0.51, 0.96]
7	Chiapas	10.05	9.73	[6.12, 15.91]	0.90	0.93	[0.65, 1.00]	0.79	0.81	[0.51, 0.97]
8	Chihuahua	4.68	4.59	[1.92, 8.12]	0.90	0.92	[0.71, 0.99]	0.76	0.77	[0.46, 0.96]
9	Distrito Federal	1.18	1.09	[0.65, 2.13]	0.94	0.96	[0.82, 0.99]	0.75	0.76	[0.47, 0.95]
10	Durango	1.74	1.68	[1.03, 2.82]	0.91	0.94	[0.68, 1.00]	0.79	0.81	[0.50, 0.97]
11	Guanajuato	4.03	3.88	[2.38, 6.50]	0.90	0.93	[0.67, 1.00]	0.79	0.81	[0.52, 0.97]
12	Guerrero	1.50	1.45	[0.84, 2.44]	0.90	0.93	[0.69, 1.00]	0.79	0.81	[0.52, 0.97]
13	Hidalgo	4.49	4.26	[2.50, 7.78]	0.93	0.95	[0.76, 1.00]	0.77	0.79	[0.51, 0.95]
14	Jalisco	2.87	2.76	[1.53, 4.85]	0.92	0.94	[0.74, 1.00]	0.75	0.76	[0.46, 0.96]
15	México	1.66	1.58	[0.83, 2.96]	0.92	0.94	[0.75, 0.99]	0.74	0.75	[0.46, 0.95]
16	Michoacán	2.93	2.84	[1.62, 4.82]	0.91	0.93	[0.70, 1.00]	0.77	0.78	[0.47, 0.97]
17	Morelos	1.94	1.86	[1.13, 3.18]	0.92	0.94	[0.73, 1.00]	0.79	0.81	[0.54, 0.96]
18	Nayarit	11.68	11.30	[7.32, 18.31]	0.90	0.93	[0.66, 1.00]	0.79	0.81	[0.51, 0.97]
19	Nuevo León	2.75	2.60	[1.52, 4.77]	0.93	0.94	[0.78, 0.99]	0.76	0.77	[0.49, 0.95]
20	Oaxaca	2.15	2.07	[1.31, 3.41]	0.91	0.94	[0.67, 1.00]	0.79	0.81	[0.49, 0.97]
21	Puebla	7.12	6.87	[4.25, 11.53]	0.91	0.94	[0.70, 1.00]	0.78	0.79	[0.51, 0.96]
22	Querétaro	2.48	2.34	[1.44, 4.34]	0.94	0.95	[0.82, 0.99]	0.77	0.78	[0.51, 0.95]
23	Quintana Roo	9.83	9.64	[4.33, 16.73]	0.91	0.92	[0.71, 1.00]	0.76	0.77	[0.47, 0.96]
24	San Luis Potosí	3.28	3.14	[1.72, 5.63]	0.92	0.94	[0.73, 1.00]	0.76	0.77	[0.48, 0.95]
25	Sinaloa	6.68	6.47	[4.09, 10.67]	0.91	0.93	[0.67, 1.00]	0.78	0.80	[0.50, 0.97]
26	Sonora	5.97	5.75	[3.51, 9.71]	0.92	0.94	[0.73, 1.00]	0.77	0.79	[0.49, 0.96]
27	Tabasco	3.64	3.53	[2.26, 5.75]	0.95	0.97	[0.77, 1.00]	0.78	0.80	[0.49, 0.97]
28	Tamaulipas	3.71	3.55	[2.09, 6.15]	0.90	0.92	[0.67, 0.99]	0.80	0.81	[0.53, 0.97]
29	Tlaxcala	2.95	2.86	[1.68, 4.84]	0.89	0.92	[0.66, 1.00]	0.78	0.79	[0.50, 0.97]
30	Veracruz	3.41	3.30	[2.11, 5.34]	0.91	0.94	[0.69, 1.00]	0.80	0.82	[0.51, 0.97]
31	Yucatán	2.22	2.14	[1.28, 3.59]	0.92	0.94	[0.70, 1.00]	0.78	0.80	[0.51, 0.96]
32	Zacatecas	5.06	4.91	[2.99, 8.03]	0.91	0.94	[0.66, 1.00]	0.78	0.80	[0.49, 0.97]

Notes: 95% CI indicates 95% credible interval.



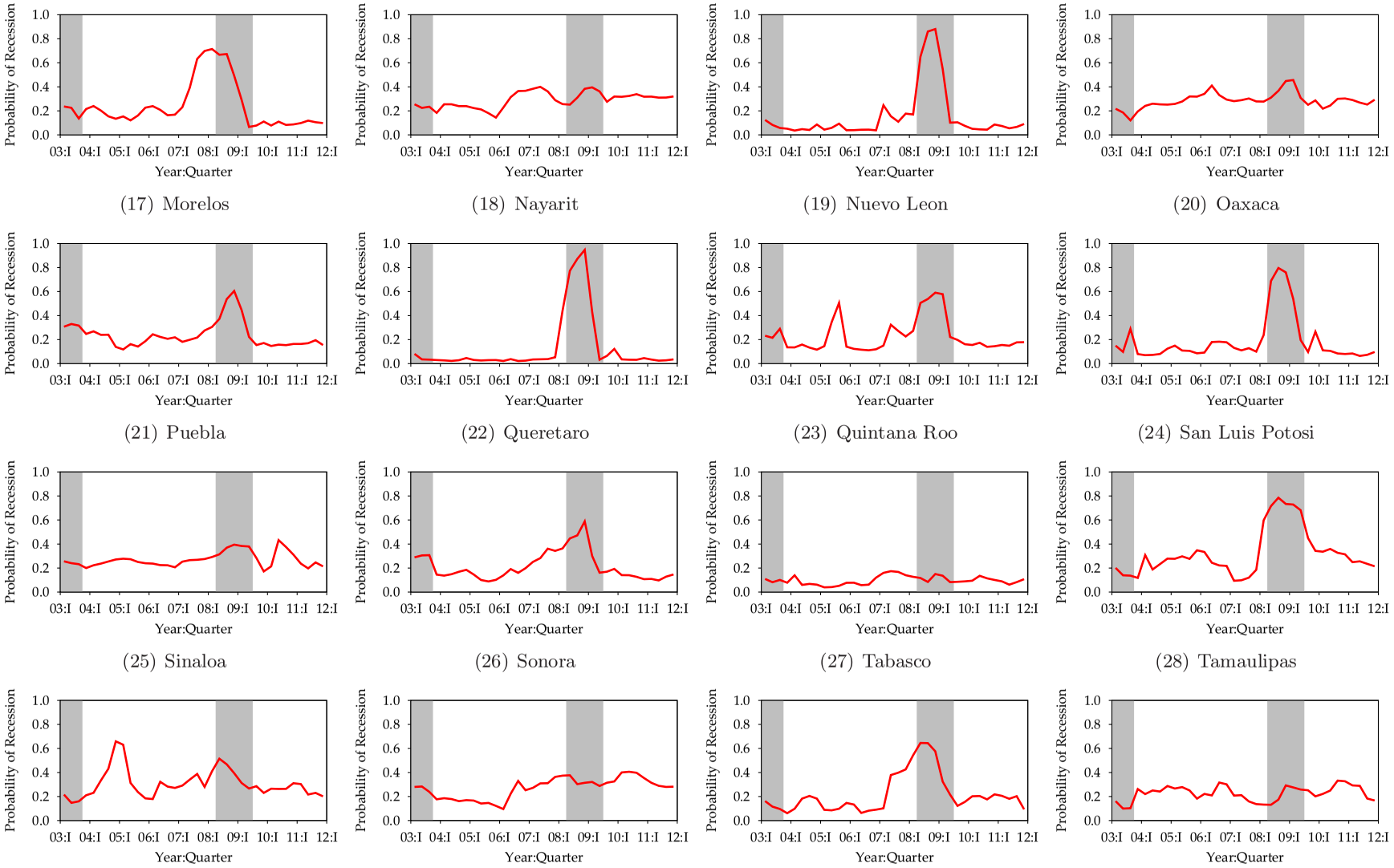
(1) Aguascalientes (2) Baja California (3) Baja California Sur (4) Campeche

(5) Coahuila (6) Colima (7) Chiapas (8) Chihuahua

(9) Distrito Federal (10) Durango (11) Guanajuato (12) Guerrero

(13) Hidalgo (14) Jalisco (15) Mexico (16) Michoacan

Figure 10: Recession Probabilities



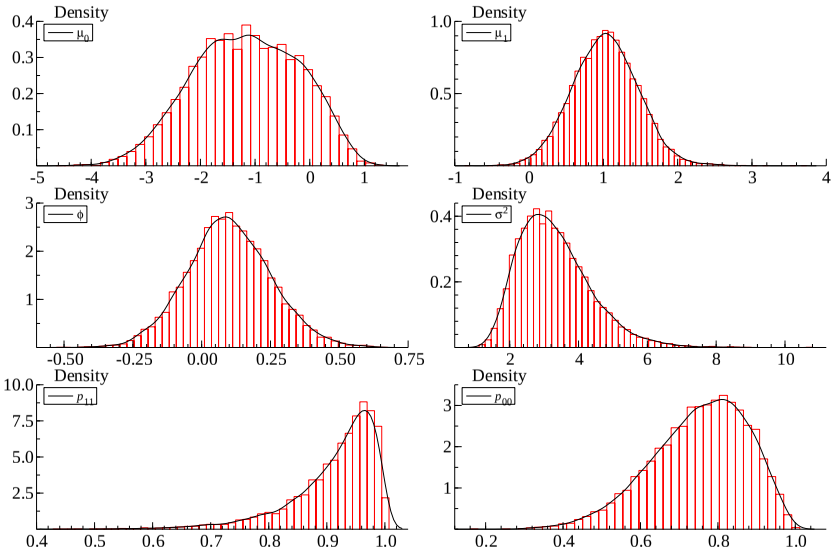
(17) Morelos (18) Nayarit (19) Nuevo Leon (20) Oaxaca

(21) Puebla (22) Queretaro (23) Quintana Roo (24) San Luis Potosi

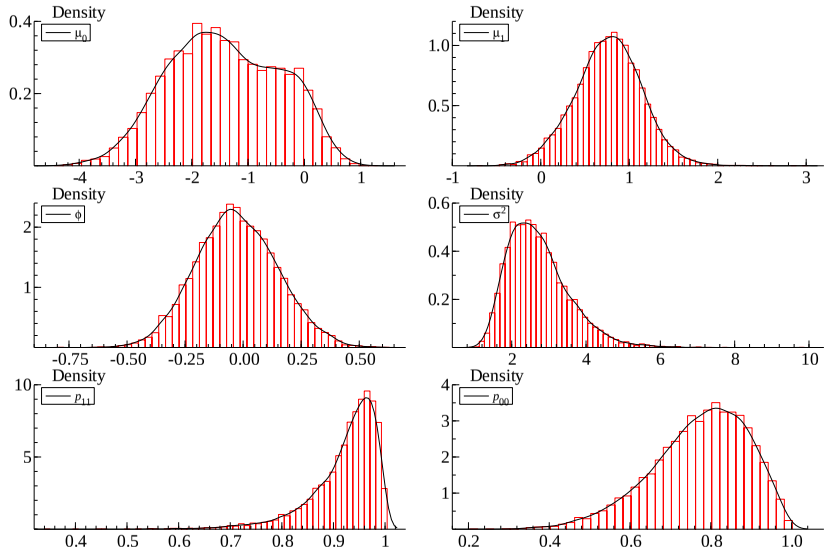
(25) Sinaloa (26) Sonora (27) Tabasco (28) Tamaulipas

(29) Tlaxcala (30) Veracruz (31) Yucatan (32) Zacatecas

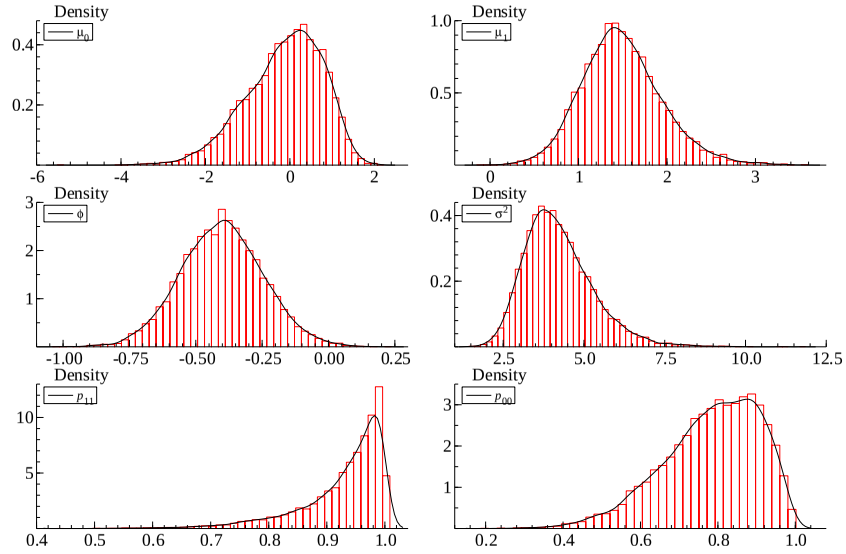
Figure 10: Recession Probabilities (Continued)



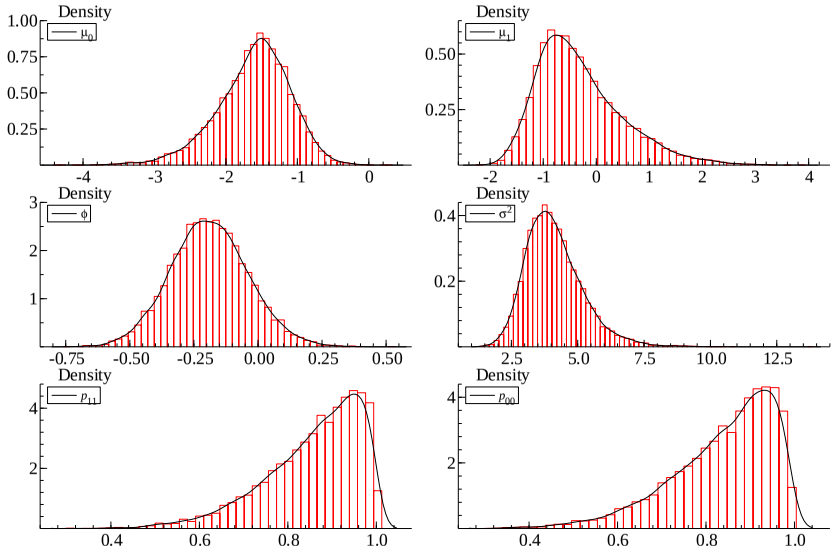
(1) Aguascalientes



(2) Baja California

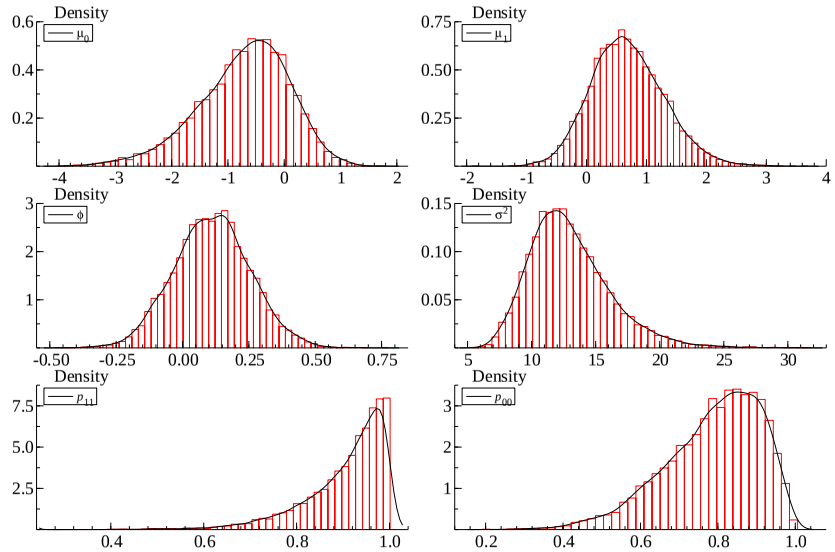


(3) Baja California Sur

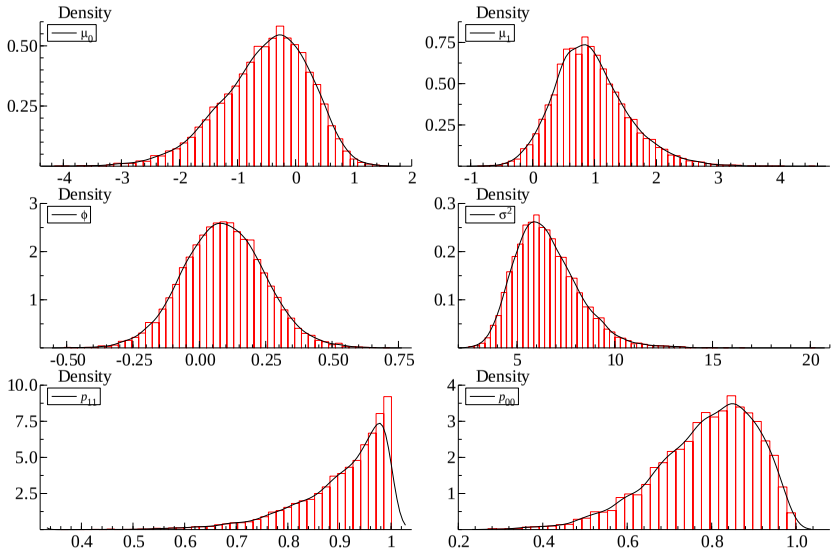


(4) Campeche

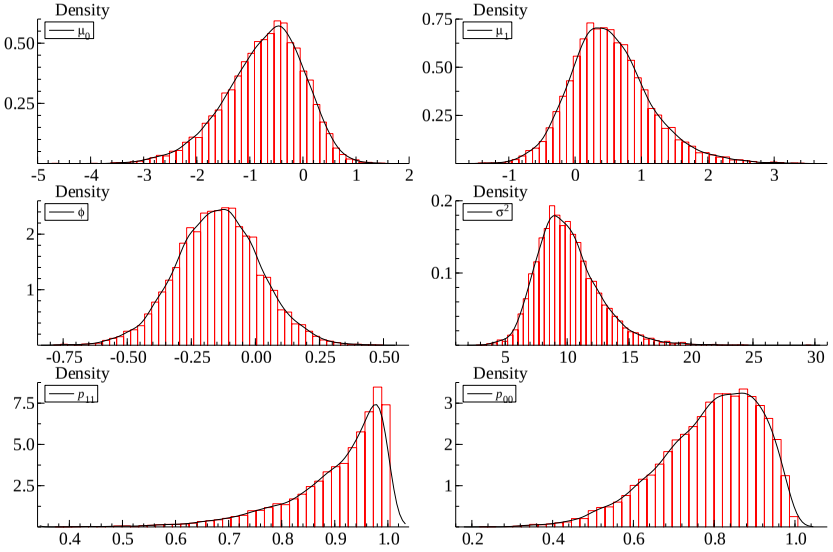
Figure 11: Posterior Distributions



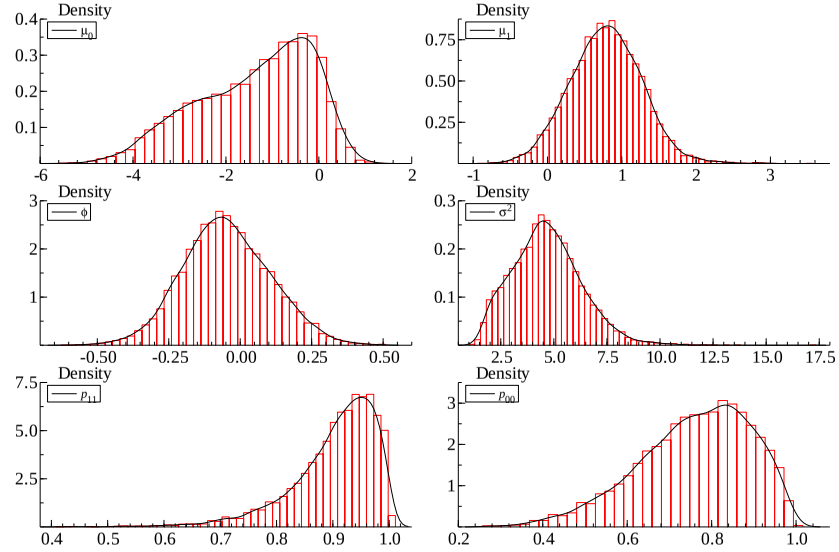
(5) Coahuila



(6) Colima

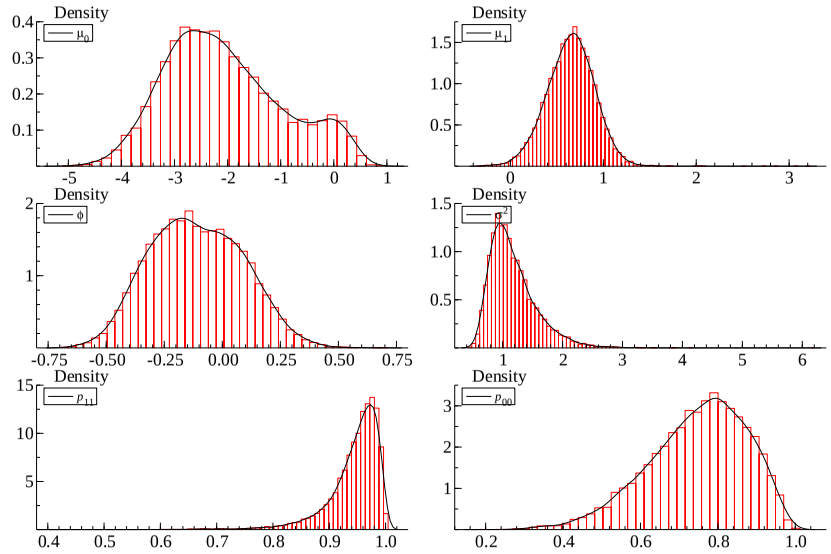


(7) Chiapas

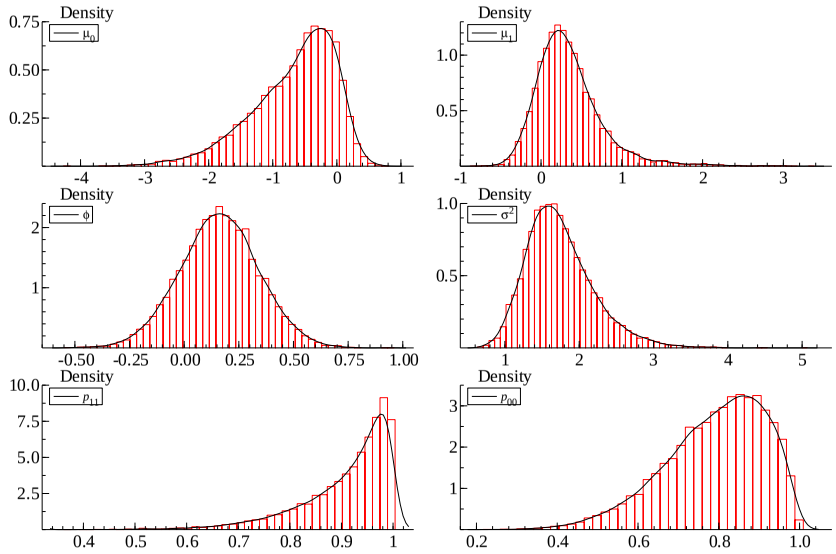


(8) Chihuahua

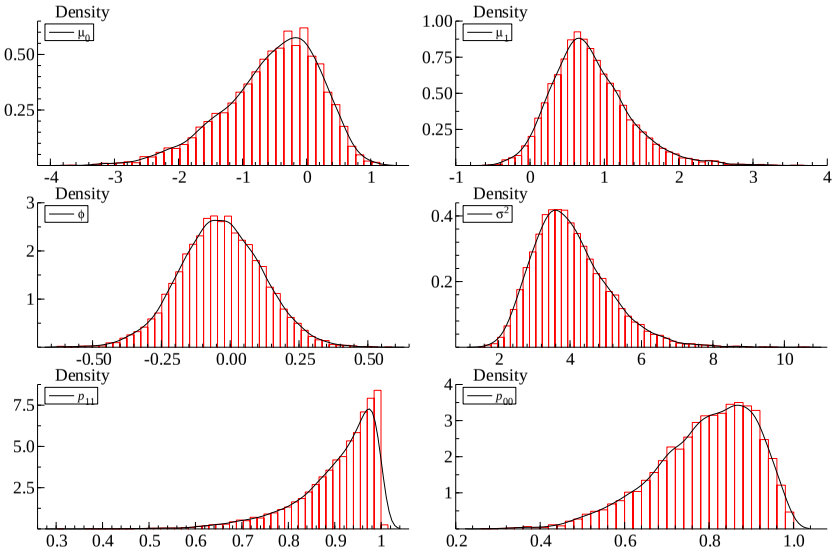
Figure 11: Posterior Distributions (Continued)



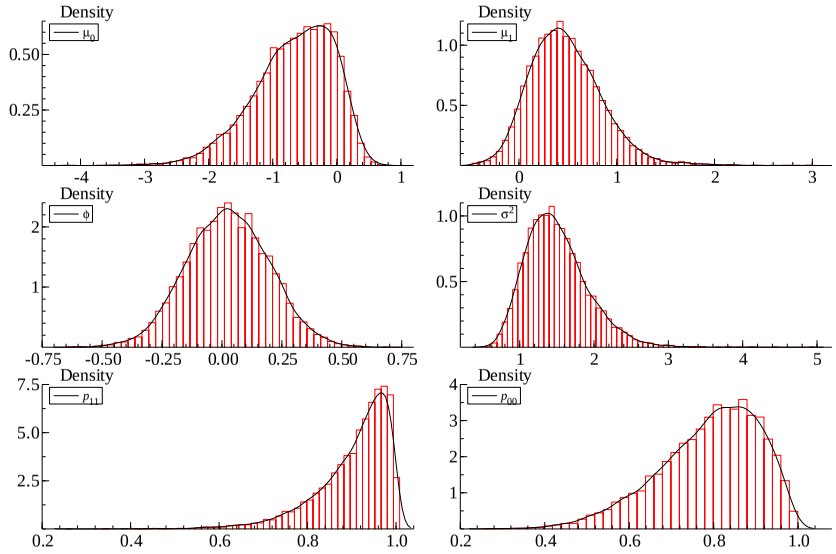
(9) Distrito Federal



(10) Durango

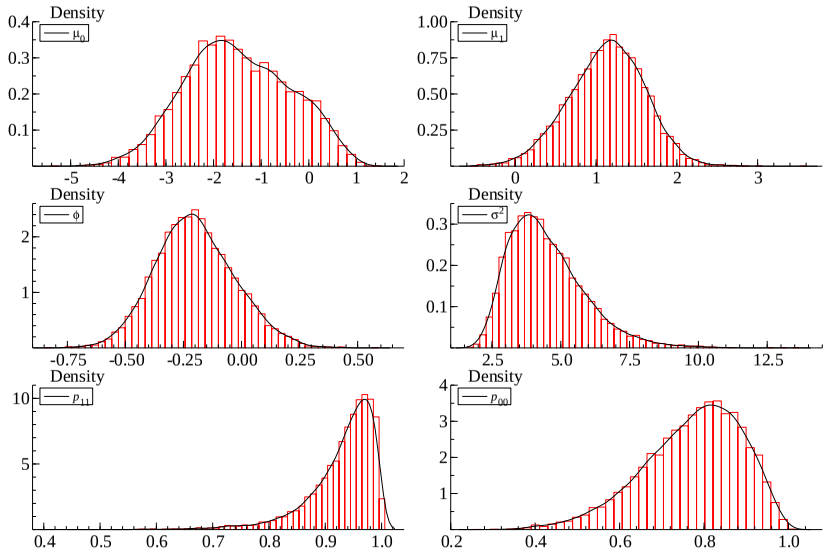


(11) Guanajuato

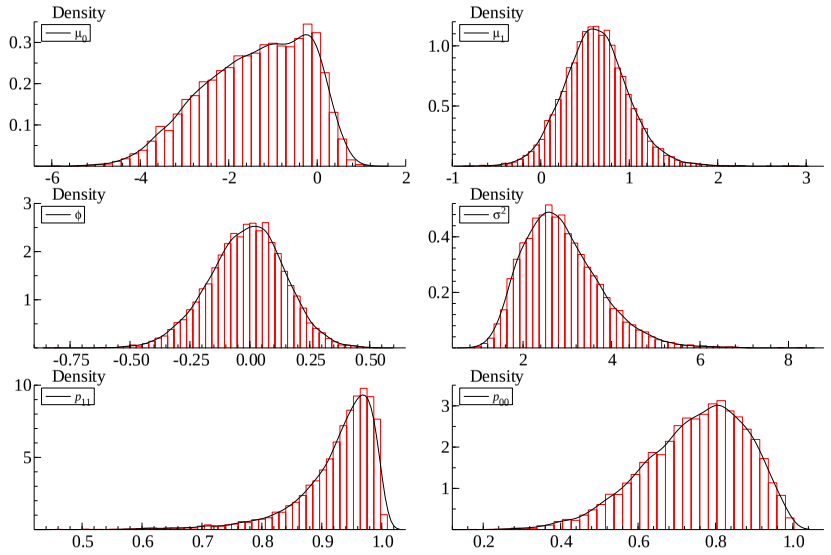


(12) Guerrero

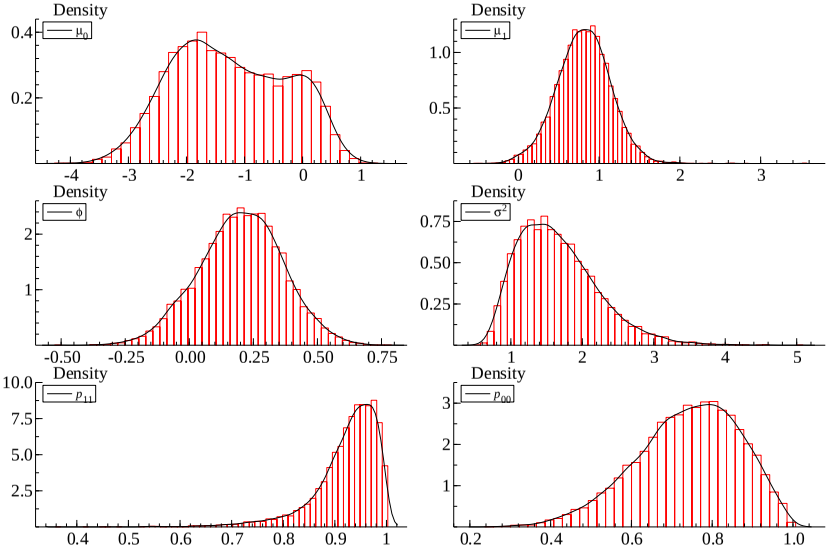
Figure 11: Posterior Distributions (Continued)



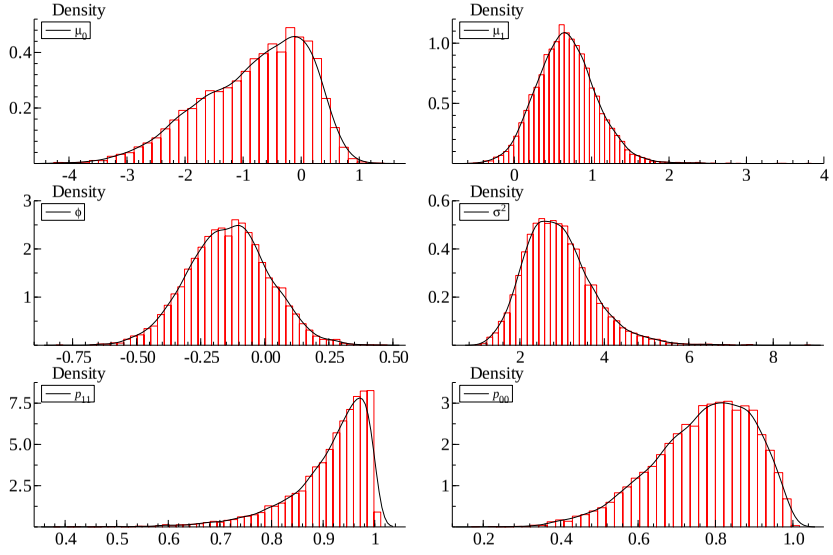
(13) Hidalgo



(14) Jalisco

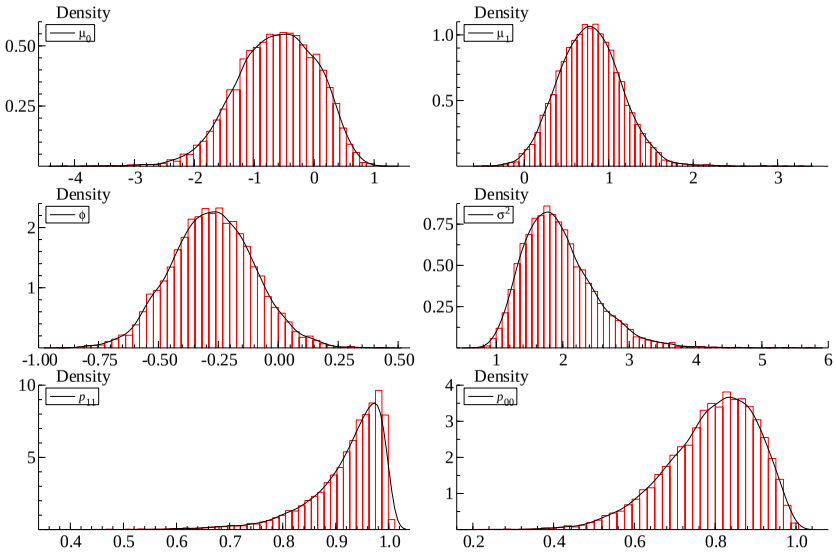


(15) Mexico

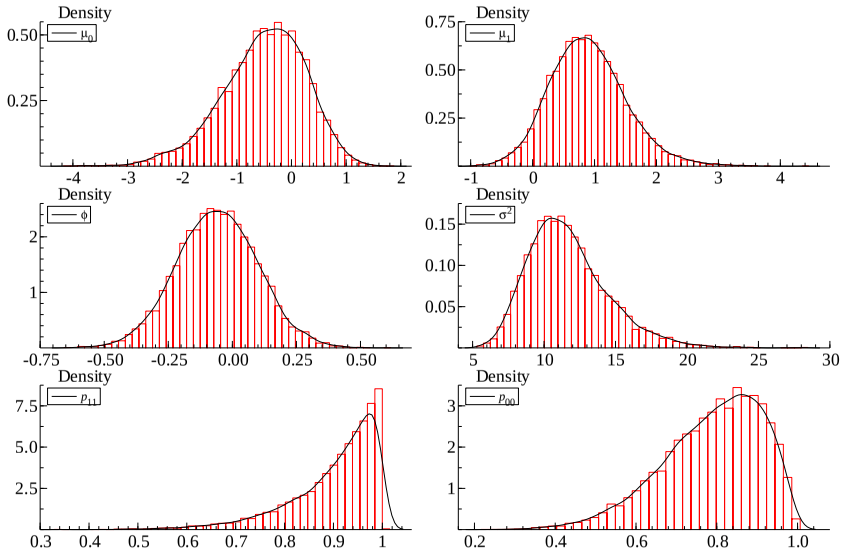


(16) Michoacan

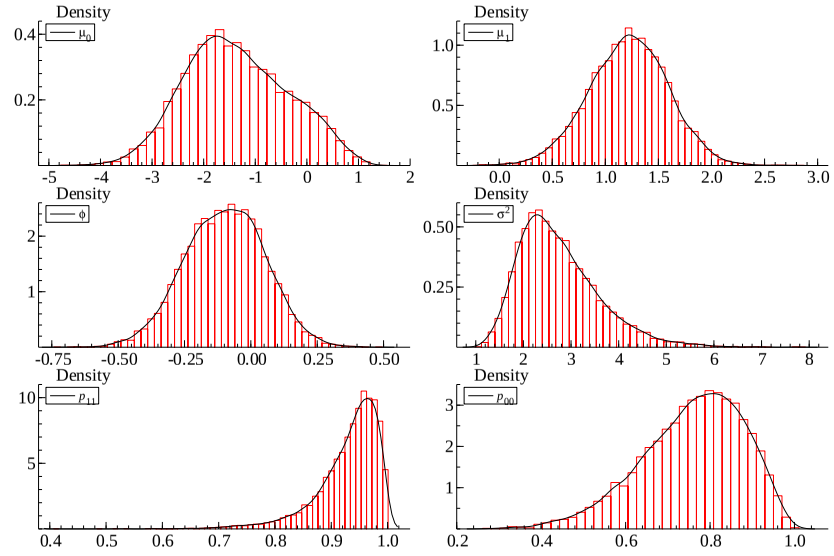
Figure 11: Posterior Distributions (Continued)



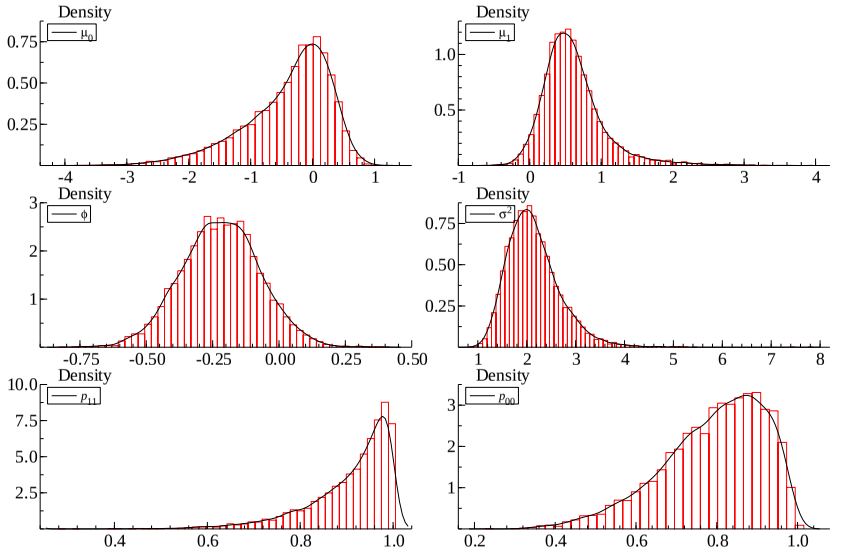
(17) Morelos



(18) Nayarit

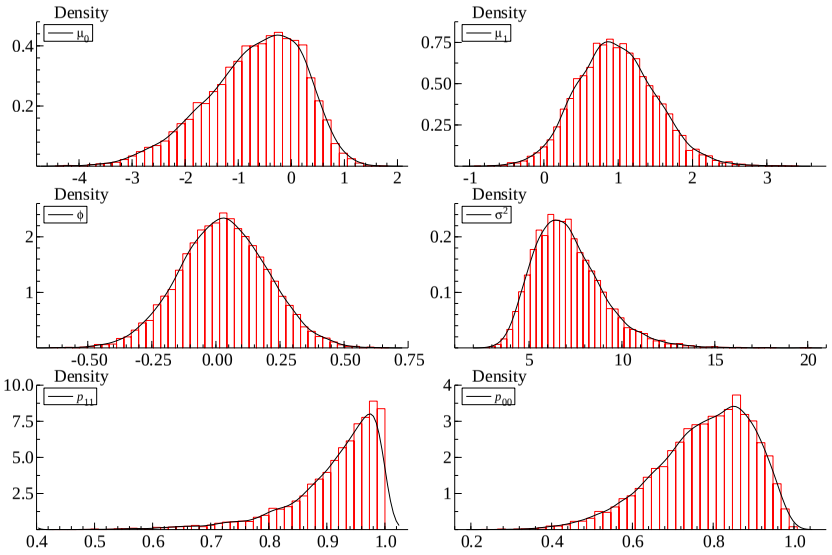


(19) Nuevo Leon

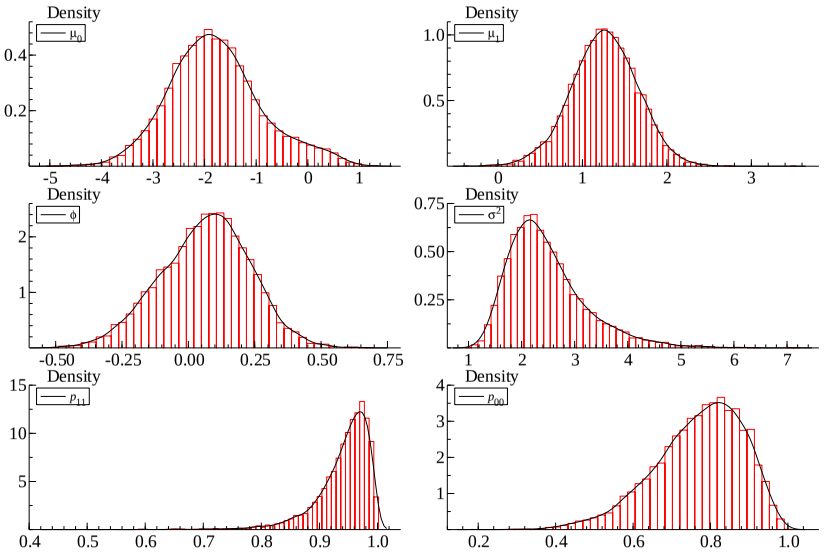


(20) Oaxaca

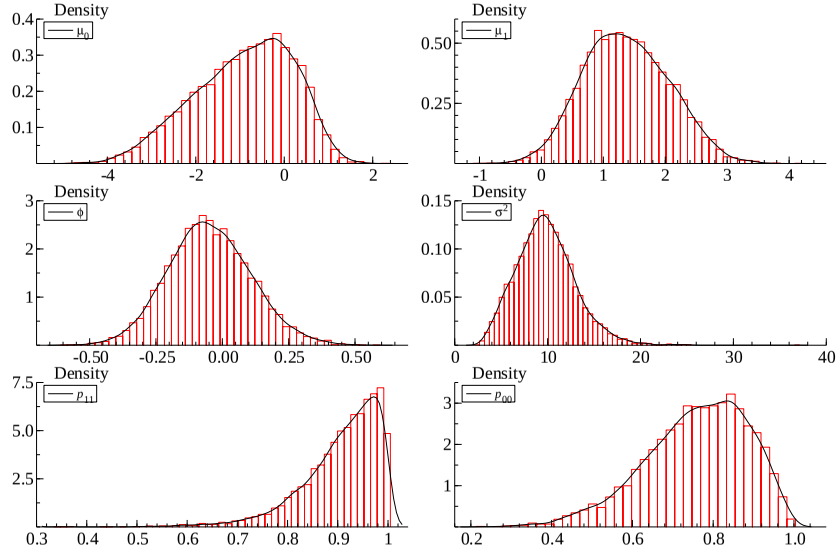
Figure 11: Posterior Distributions (Continued)



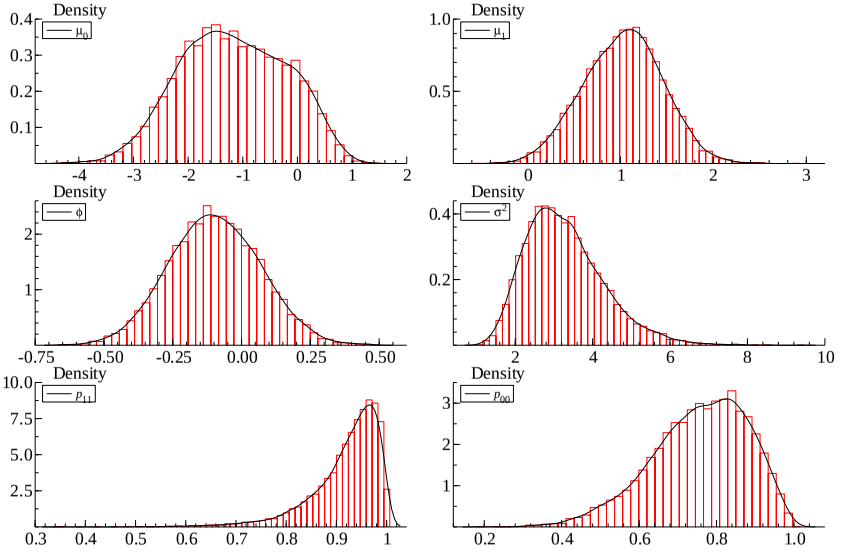
(21) Puebla



(22) Queretaro

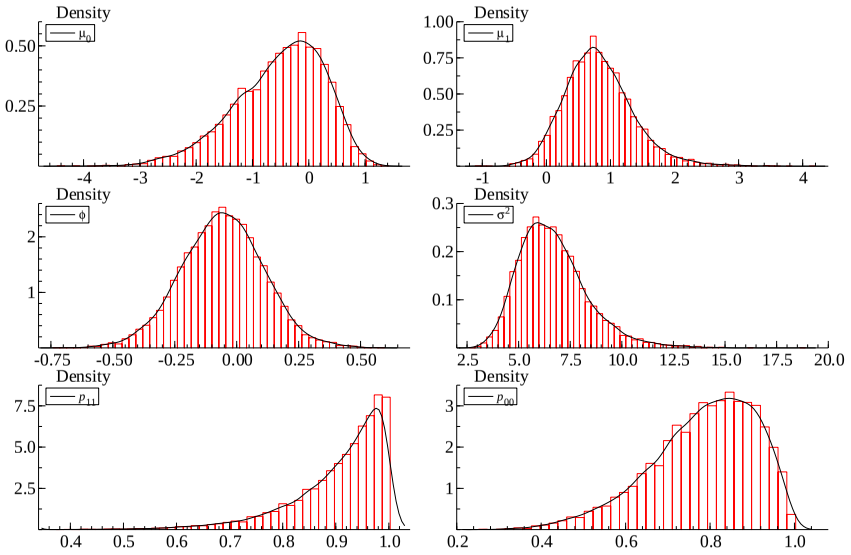


(23) Quintana Roo

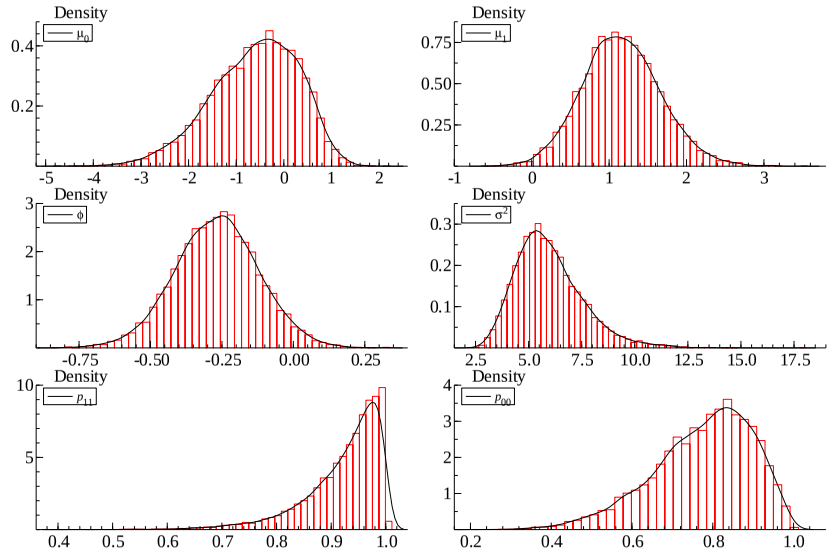


(24) San Luis Potosi

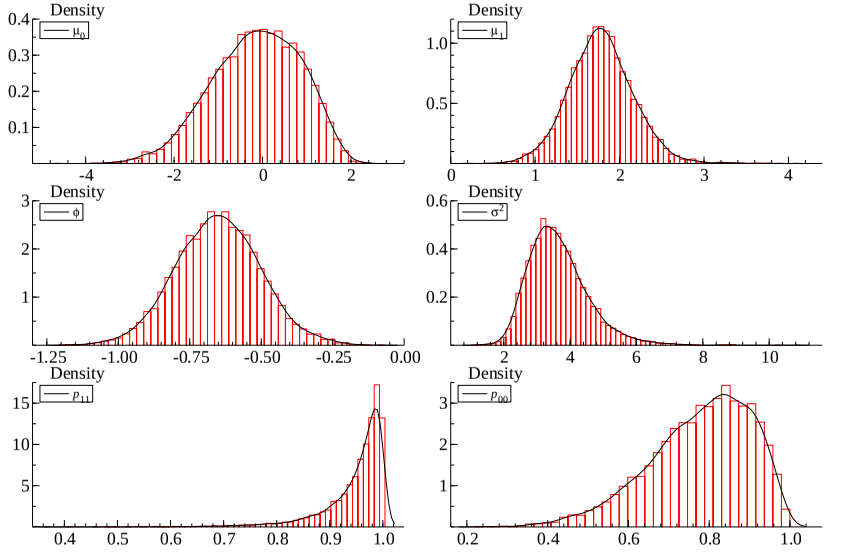
Figure 11: Posterior Distributions (Continued)



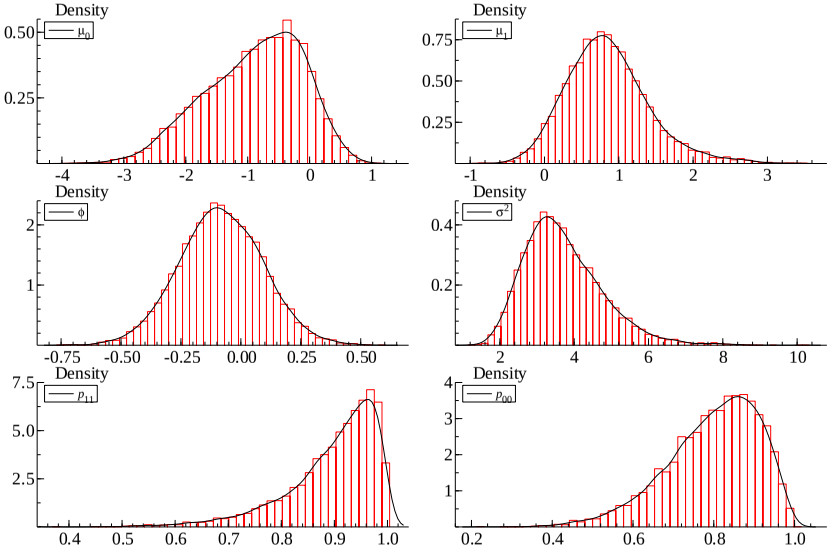
(25) Sinaloa



(26) Sonora

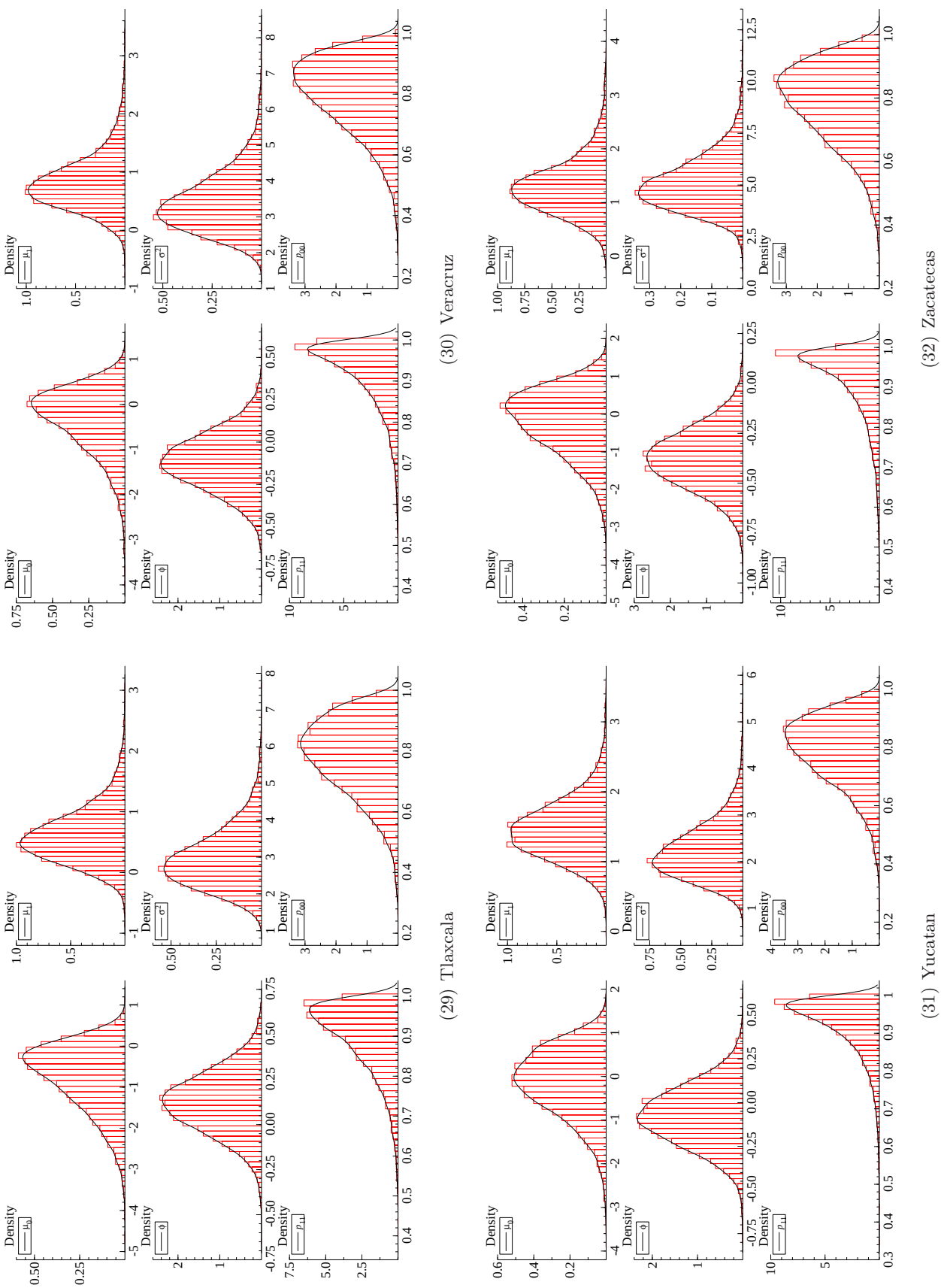


(27) Tabasco



(28) Tamaulipas

Figure 11: Posterior Distributions (Continued)



(29) Tlaxcala (30) Veracruz

(31) Yucatan (32) Zacatecas

Figure 11: Posterior Distributions (Continued)

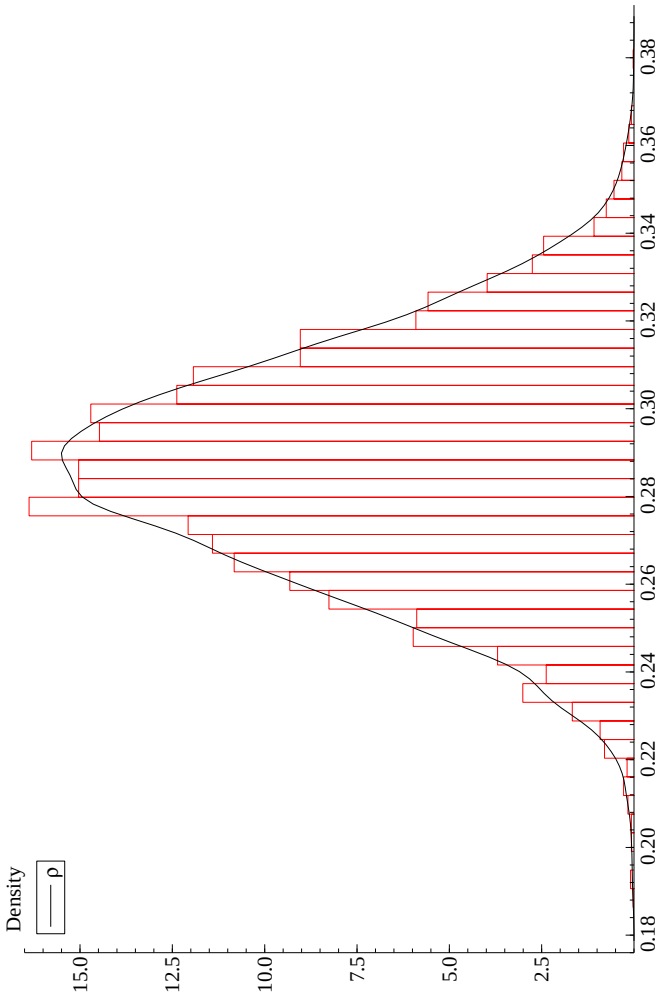


Figure 12: Posterior Distribution of ρ