Trabajo Estadística Bayesiana

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Francisco Villarroel¶

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Introducción

HOLA ESTE ES UN TRABAJO MUY BACán

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

Driff Diffution model

You can also embed plots, for example:

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.ç

Explicación del experimento

Se observó el comportamiento de veinte personas mientras participaban en un juego de ruleta. Su tarea era apostar por uno de los dos colores (naranjo o celeste). Cada uno de los colores se identifica con la probabilidad de obtener un premio determinado. Algunas ruletas cuentan con un área gris (máscara) que oculta el verdadero color de la sección (ambigüedad).

#Modelación

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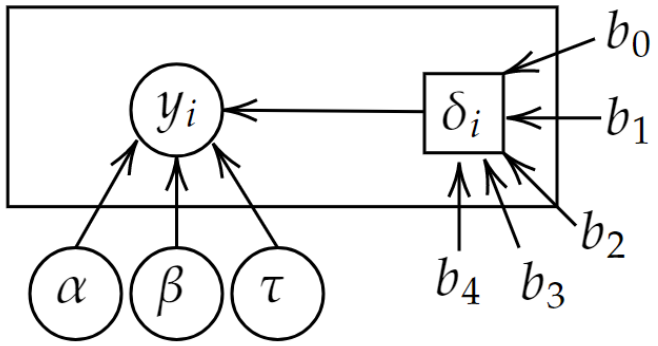
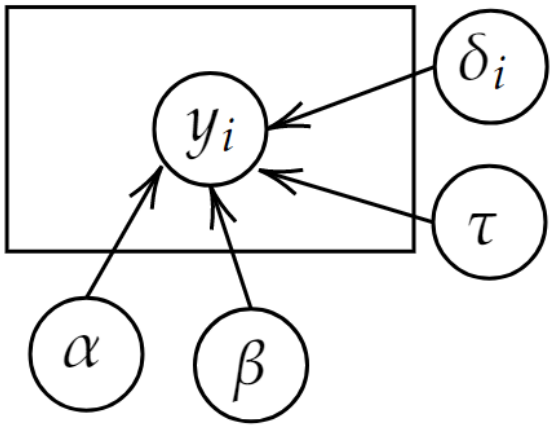


$$y_i \sim \ wiener\ (\alpha, \beta, \tau, \delta_i)$$
$$\delta_i = f(p, o)$$
$$\alpha \sim unif$$
$$\beta \sim unif$$
$$\tau \sim unif$$
$$b \sim norm(\mu, \sigma)$$



$$y_i \sim wiener(\alpha, \beta, \tau, \delta)$$
$$\delta_i = unif$$
$$\alpha \sim unif$$
$$\beta \sim unif$$
$$\tau \sim unif$$

Resultados - Modelos y tablas sumarias

Modelo 1

$$Y_{(ij)} \sim \text{ Wiener } (\alpha_{(ij)}, \beta_{(ij)}, \tau_{(ij)}, \delta_{(ij)})$$

Este modelo supone una distribucion Wiener dependiente de los parámetros alfa, beta, tay y delta en función de los sujetos estudiados y los *trials*.

Table 1: Media de los parámetros modelados

Modelo 1					
Parámetro	A	B	C	D	E
α	0.76461	0.9084	0.92244	0.93057	0.95987
β	0.46303	0.51041	0.49342	0.5304	0.54067
τ	0.0045092	0.0081149	0.001054	0.017666	0.016152
δ	0.66599	0.085327	0.36738	-0.13167	0.26716

Modelo 2

$$Y_{(ij)} \sim \text{Wiener}(\alpha_{(ij)}, \beta_{(ij)}, \tau_{(ij)}\delta_{(p_{ij}, o_{ij})})$$

Al igual que el modelo 1 se contemplan los mismos parámetros, con la excepción que el parámetro delta depende linealmente de la probabilidad y del premio normalizado

[chantar toda la wea de graficos y tablas acá]

Table 2: Media de los parámetros modelados

Modelo 2					
Parámetro	A	B	C	D	E
α	0.88527	0.9671	0.96805	0.95355	0.9938
β	0.45883	0.502	0.49792	0.52661	0.53689
τ	0.0021536	0.0061823	0.00085613	0.016333	0.015132
b_0	11.642	6.8589	5.3276	3.0593	2.7807
b_1	-13.817	-7.7817	-5.7075	-2.9145	-1.3458
b_2	-8.503	-5.3981	-4.3687	-3.2749	-4.0697

Modelo 3

$$Y_{(ij)} \sim \text{Wiener}(\alpha_{(ij)}, \beta_{(ij)}, \tau_{(ij)}, \delta_{(p_{ij}, o_{ij})})$$

En esta weá p y o dependen cuadráticamente

[chantar toda la wea de graficos y tablas acá]

Table 3: Media de los parámetros modelados

Modelo 3					
Parámetro	A	B	C	D	E
α	0.88881	0.96849	0.97048	0.95588	0.9952
β	0.45816	0.50246	0.49924	0.5284	0.53707
τ	0.0021119	0.0061697	0.0010137	0.016375	0.015178
b_0	10.486	6.9346	4.8691	1.8444	2.3766
b_1	-10.635	-7.3161	-2.0708	-0.16917	1.3034
b_2	-5.3338	-6.343	-6.2612	0.36938	-5.0773
b_3	-3.264	-0.47105	-3.4009	-2.7109	-2.5218
b_4	-3.2369	0.94515	2.0646	-3.6848	1.1816

Modelo 4

$$Y_{(ij)} \sim \text{Wiener}(\alpha_{(ij)}, \beta_{(ij)}, \tau_{(ij)}, \delta_{(p_{ij})})$$

sólo p depende cuadráticamente

Table 4: Media de los parámetros modelados

Modelo 4					
Parámetro	A	B	C	D	E
α	0.83153	0.93395	0.94481	0.93427	0.96406
β	0.46895	0.50739	0.49798	0.52976	0.53892
τ	0.0029797	0.0070839	0.0011369	0.017322	0.015736
b_0	2.5307	2.1188	0.92531	0.34464	-0.76552
b_1	1.7668	-4.2162	2.2647	-0.33574	5.1825
b_3	-8.9003	0.55325	-5.3849	-0.91345	-4.9913

Modelo 5

$$Y_{(ij)} \sim \text{Wiener}(\alpha_{(ij)}, \beta_{(ij)}, \tau_{(ij)}, \delta_{(o_{ij})})$$

Sólo O depende cuadráticamente

[chantar toda la wea de graficos y tablas acá]

Table 5: Media de los parámetros modelados

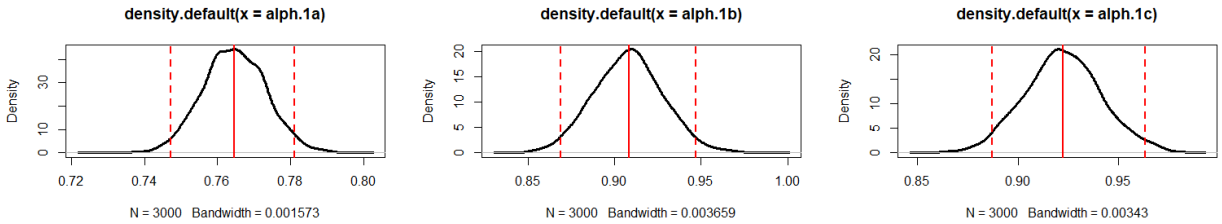
Modelo 5					
Parámetro	A	B	C	D	E
α	0.76539	0.90863	0.92702	0.9406	0.9907
β	0.46397	0.51086	0.49501	0.53197	0.53686
τ	0.0044623	0.0079759	0.0012098	0.017156	0.015165
b_0	0.3456	0.21885	1.6944	-0.073462	2.3286
b_2	0.70658	-0.45442	-5.3103	2.6437	-6.063
b_4	-0.037301	0.27331	4.1839	-4.4153	2.5567

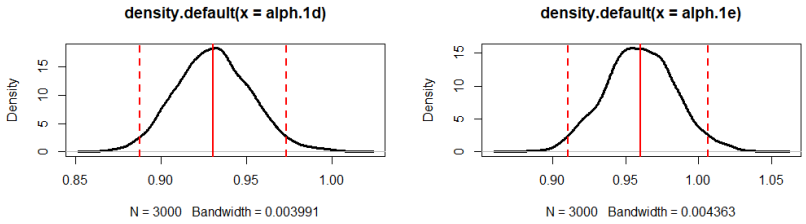
Resultados - análisis de parámetros comparados por modelo

Alfa Modelo 1

Mayores niveles de α *(trade-off Speed-accuracy)* está relacionado con un mayor nivel de accuracy que tuvieron los participantes. Si comparamos todos los α , como se muestran en la figura 1, desde la figura 1 “alph.1a” (sin ambigüedad) hasta la “alph1.e” (mayor nivel de ambigüedad); es posible apreciar que entre menor grado de ambigüedad, más bajo es el nivel de α , es decir, menor accuracy, el que iría aumentando a medida que el contraste incrementa.

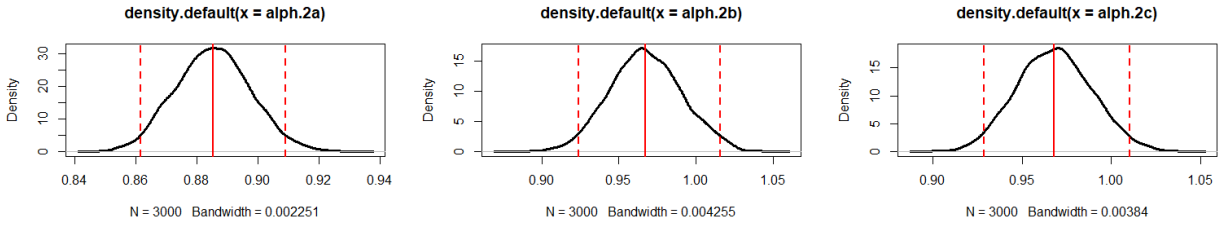
Esto podría deberse a que en “alpha.1a”, la velocidad podría verse disminuida ya que los participantes pueden ver con claridad (no hay ambigüedad) la barra de la ruleta con los colores, y así, “tomarse más tiempo” para tomar una decisión; lo que no ocurriría en alpha1.e, ya que la barra tiene una máscara que oculta el verdadero color de esas áreas.

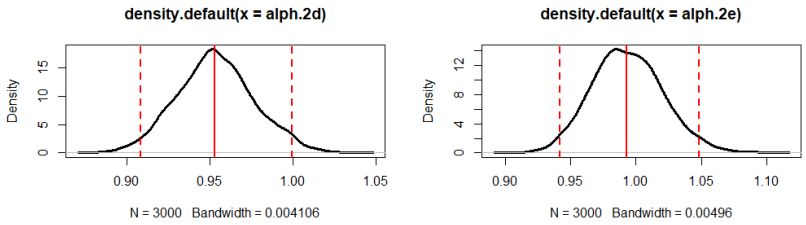




alfa modelo 2

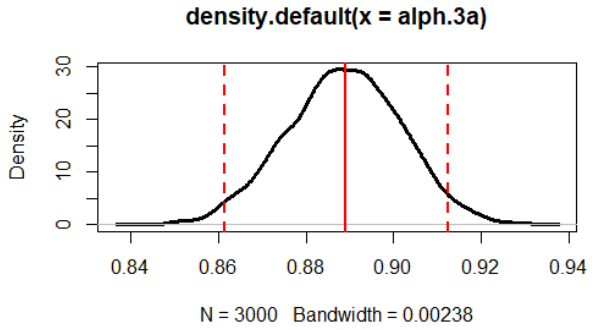
Con respecto a los α , a nivel general, al igual que en el modelo 1, cuando no se presenta el contraste o ambigüedad, el trade-off entre el tiempo y accuracy es menor, a que cuando hay ambigüedad.

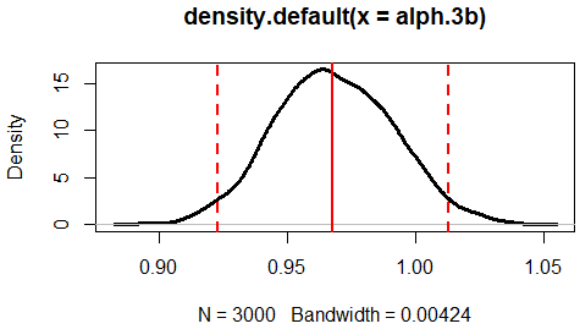


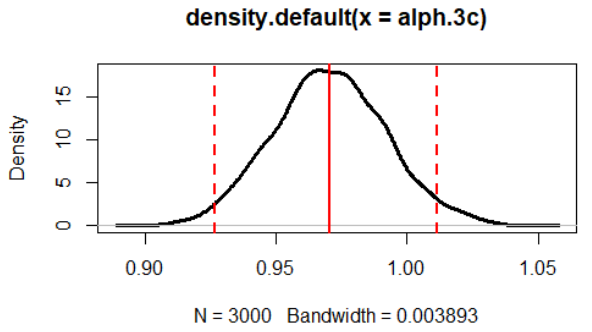


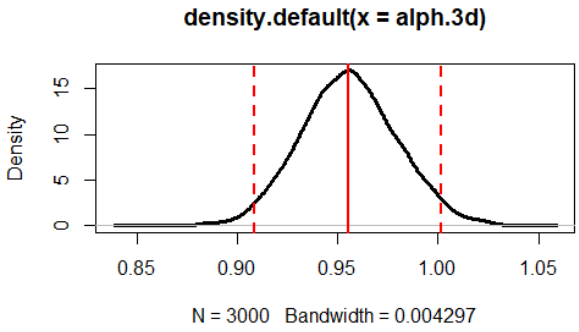
Alfa Modelo 3

En relación a los α , al igual que en los modelos anteriores (1 y 2), cuando no hay presencia de ambigüedad (contraste que oscurece la barra), el trade-off entre el tiempo y accuracy es menor a cuando si hay presencia de ambigüedad.



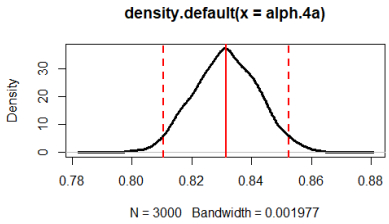


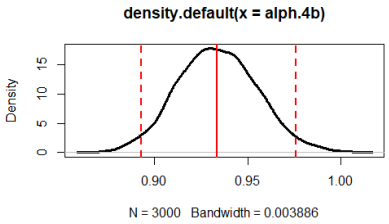


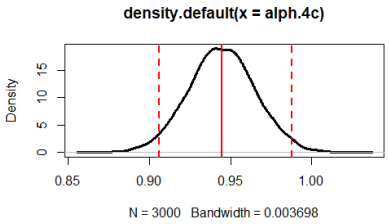


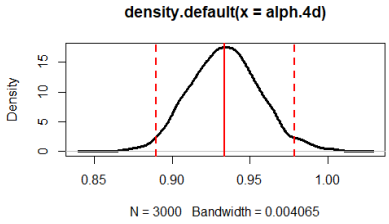
Alfa modelo 4

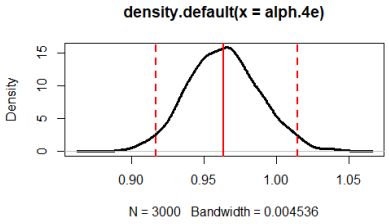
En relación a los α del modelo 3, al igual que en los modelos anteriores (1,2 y 3), cuando no hay presencia de ambigüedad (contraste que oscurece la barra), el trade-off entre el tiempo y accuracy, es menor a cuando si hay ambigüedad.





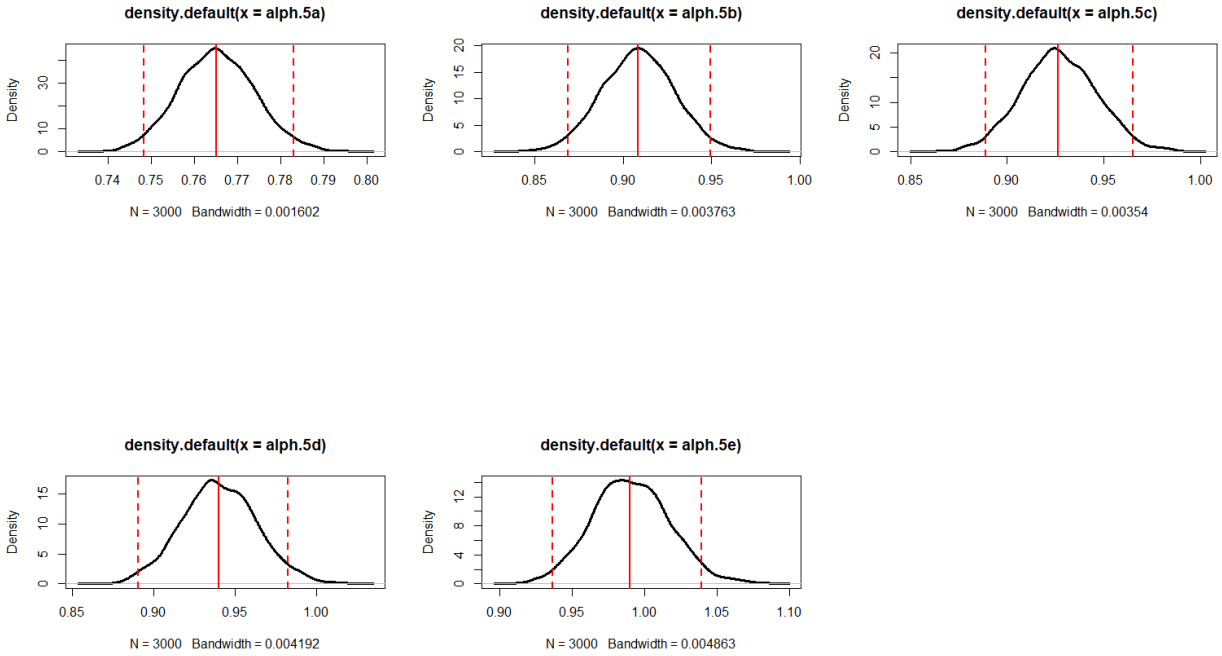






Alfa modelo 5

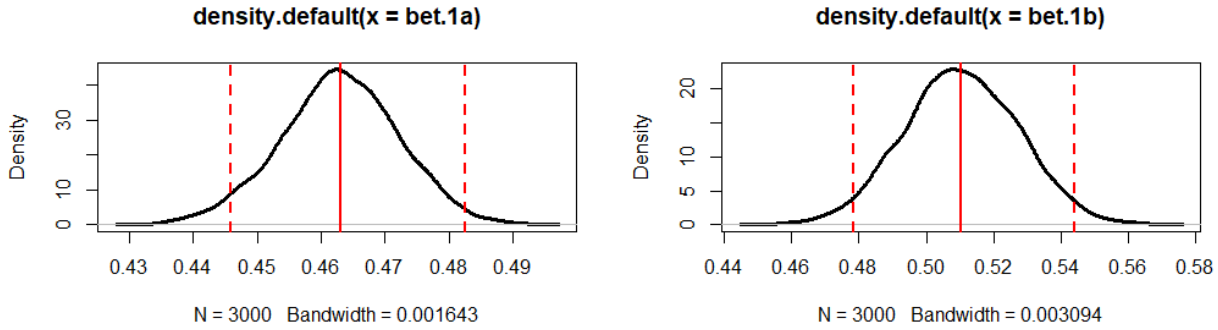
Con respecto a los α, a nivel general, al igual que en los modelos 1,2,3 y 4, cuando no se presenta el contraste o ambigüedad, el trade-off entre el tiempo y accuracy es menor a que cuando hay ambigüedad, o el contraste es ambiguo.

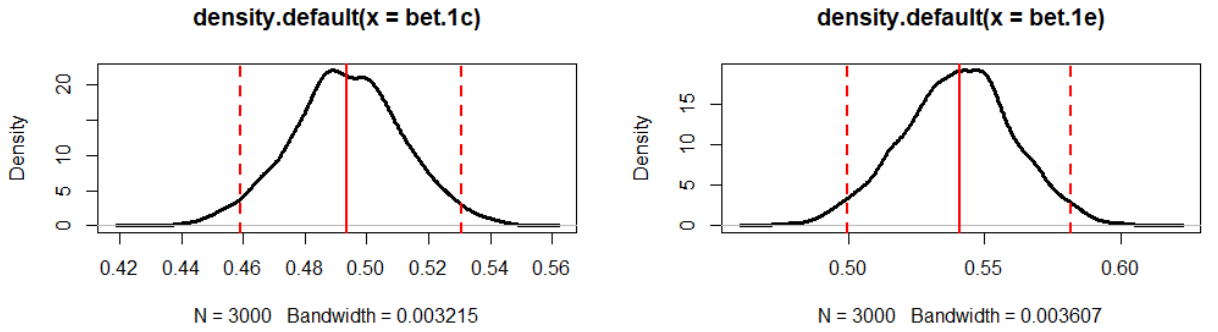


Betas

Betas modelo 1

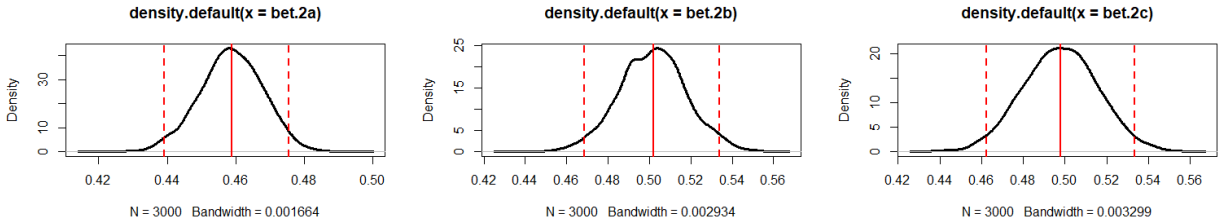
Respecto a los β, cuando no se presenta ambigüedad, es posible apreciar que existe cierto margen de sesgo *(bias)* hacia presionar el botón de la ruleta izquierdo. Sin embargo, a medida que se va presentando ambigüedad, el sesgo deja de presentarse.

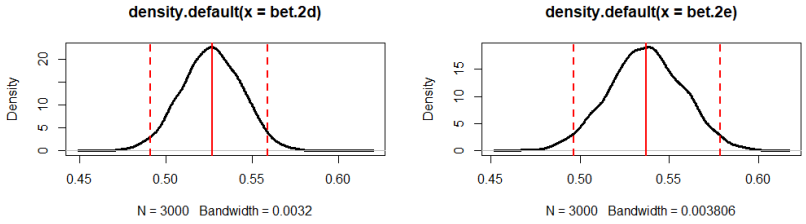




Betas modelo 2

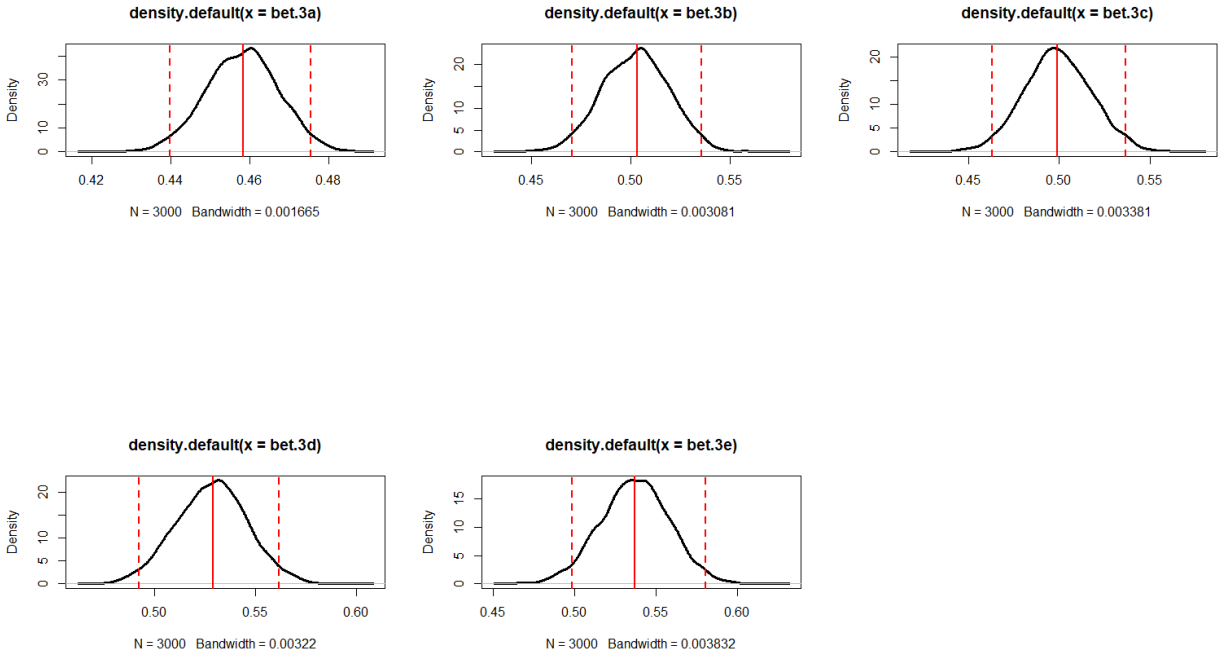
Respecto al β o *bias inicial*, cuando no hay ambigüedad, nuevamente (al igual que el Beta del modelo 1), existe un sesgo hacia presionar la barra izquierda, versus la derecha. Fenómeno que tendería a desaparecer a medida que el contraste de la barra y/o ambigüedad que se va presentando aumenta.





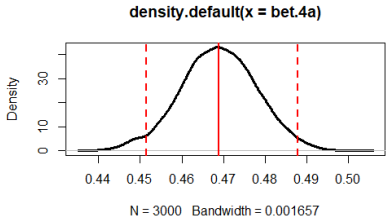
Beta modelo 3

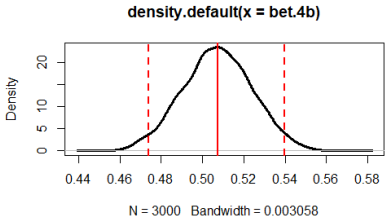
Respecto al β, cuando no hay ambigüedad, nuevamente, existe un sesgo hacia presionar la barra izquierda, versus la derecha. Fenómeno que tendería a desaparecer a medida que el contraste de la barra y/o ambigüedad que va teniendo el participante, aumenta.

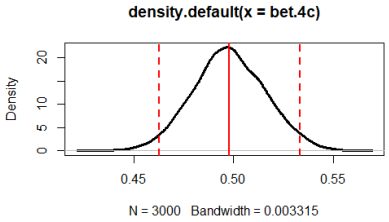


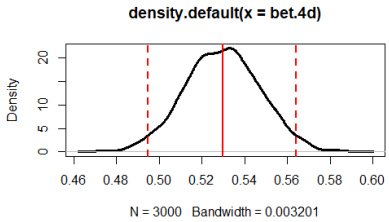
Beta modelo 4

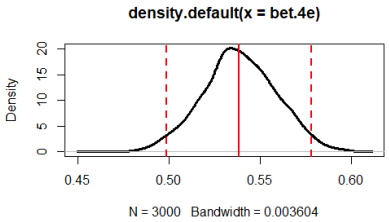
Respecto al β o bias inicial, cuando no hay ambigüedad, nuevamente, existe un sesgo hacia presionar la barra izquierda, versus la derecha. Fenómeno que tendería a desaparecer a medida que el contraste de la barra y/o ambigüedad que va teniendo el participante, aumenta.





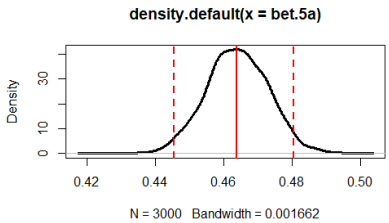


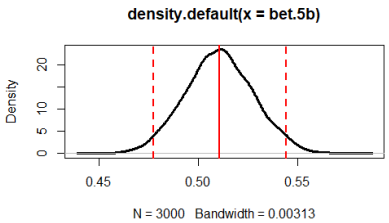


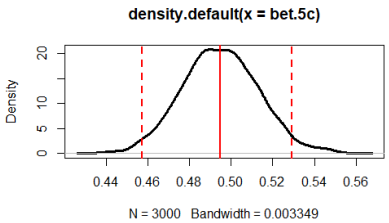


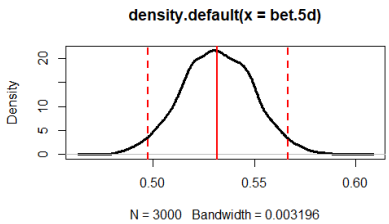
Beta modelo 5

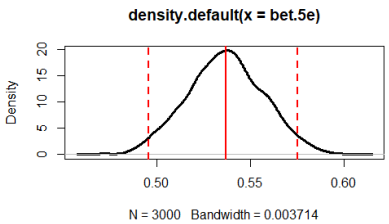
Respecto al β o bias inicial, cuando no hay ambigüedad, nuevamente, existe un sesgo hacia presionar la barra izquierda, versus la derecha. Fenómeno que tendería a desaparecer a medida que el contraste de la barra y/o ambigüedad que va teniendo el participante, aumenta.



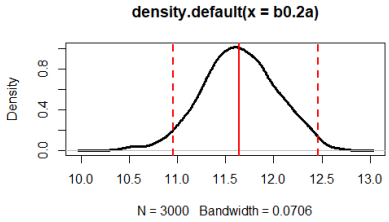








###b0 modelo 2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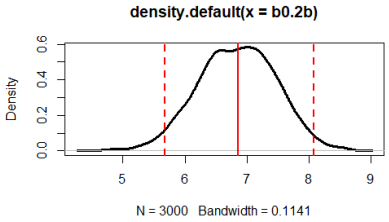
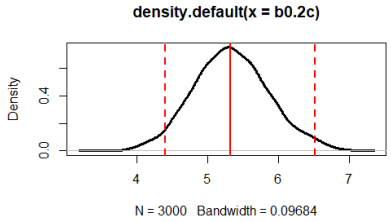
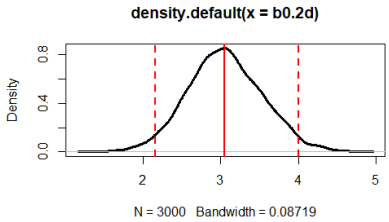
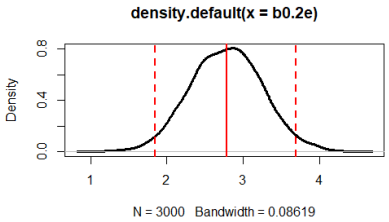
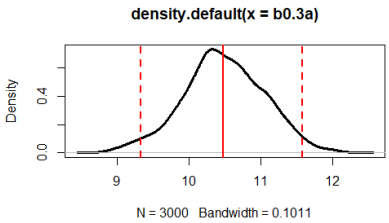
Density
N = 3000 Bandwidth = 0.0706

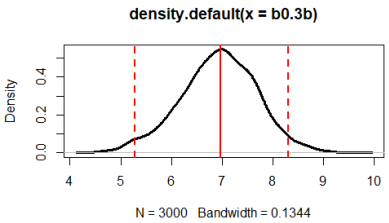

density.default(x = b0.2b)
Density
N = 3000 Bandwidth = 0.1141

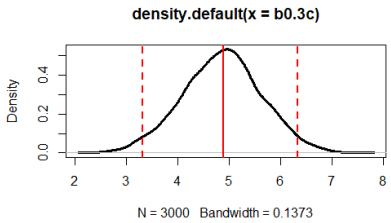

density.default(x = b0.2c)
Density
N = 3000 Bandwidth = 0.09684

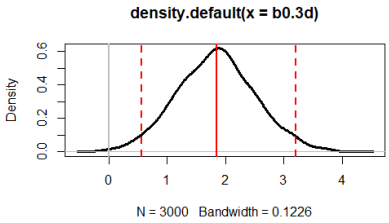

density.default(x = b0.2d)
Density
N = 3000 Bandwidth = 0.08719

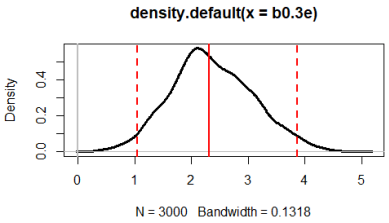

density.default(x = b0.2e)
Density
N = 3000 Bandwidth = 0.08619


density.default(x = b0.3a)
Density
N = 3000 Bandwidth = 0.1011

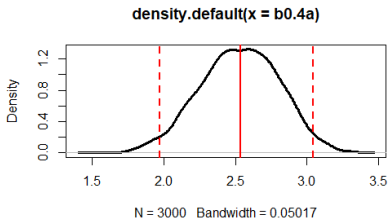

density.default(x = b0.3b)
Density
N = 3000 Bandwidth = 0.1344

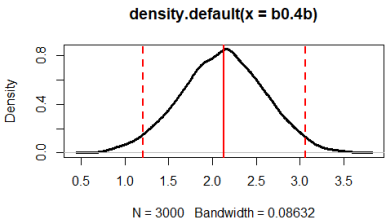

density.default(x = b0.3c)
Density
N = 3000 Bandwidth = 0.1373

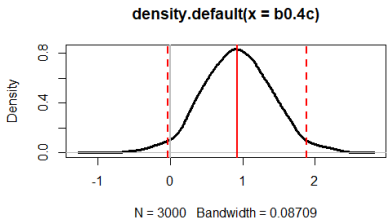

density.default(x = b0.3d)
Density
N = 3000 Bandwidth = 0.1226

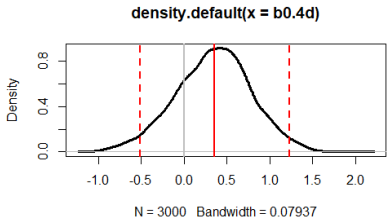

density.default(x = b0.3e)
Density
N = 3000 Bandwidth = 0.1318

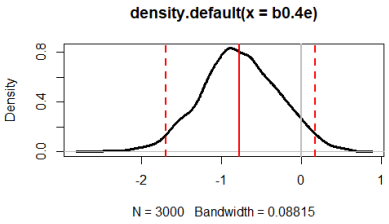
B0 modelo 3





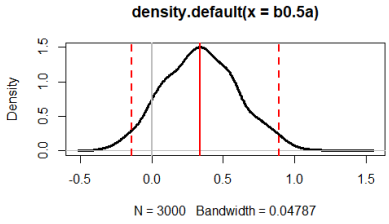


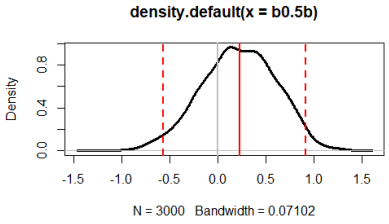


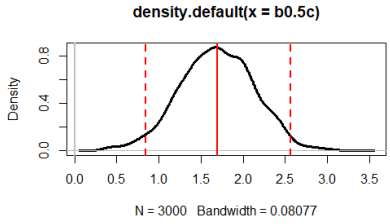


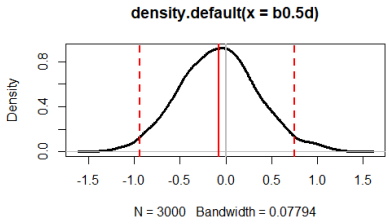
B0 modelo 4

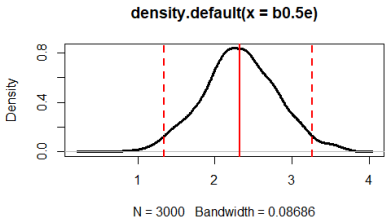
Beta0 . modelo 5





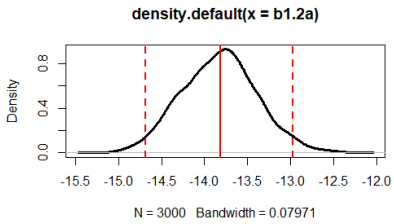


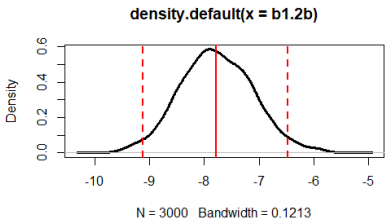


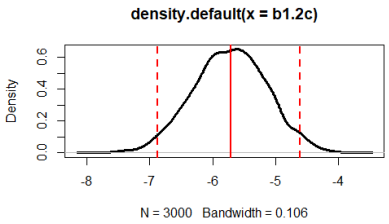


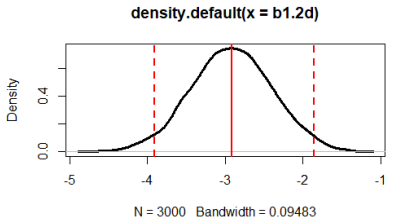
###B1 modelo 2

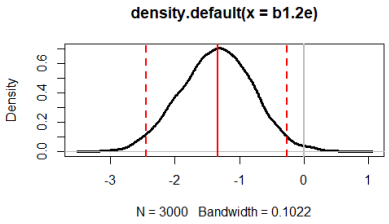
De acuerdo a los b1, tanto en condiciones de ambigüedad como de no ambigüedad, la probabilidad que acompaña al b1 si influye en el cálculo del drift.



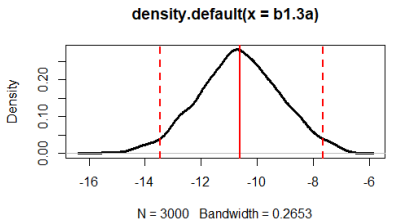


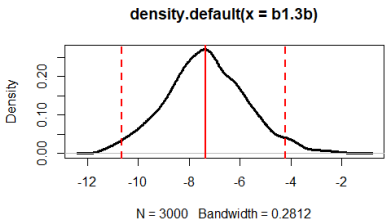


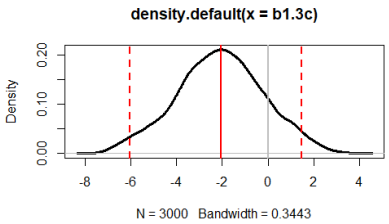


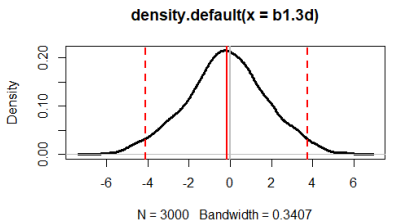


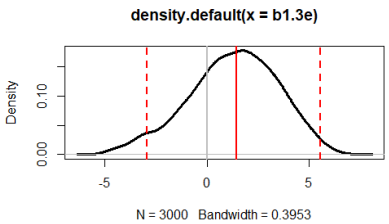
B1 modelo 3





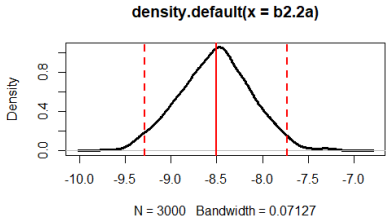


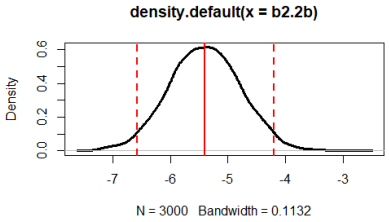


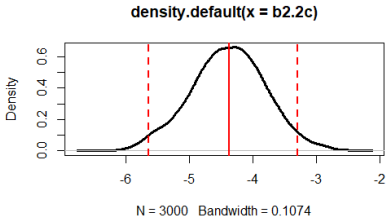


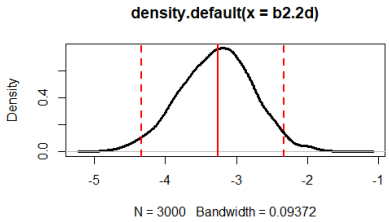
###B2 modelo 2

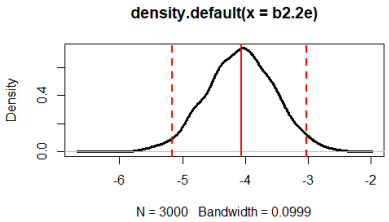
Finalmente, respecto a b2, tanto en condiciones de ambigüedad como de no ambigüedad, el pago que acompaña al b2 si influye en el cálculo del drift.



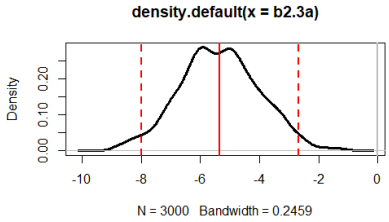


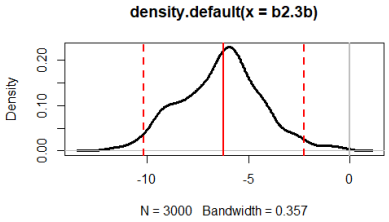


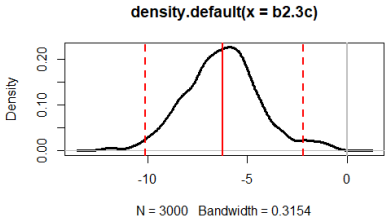


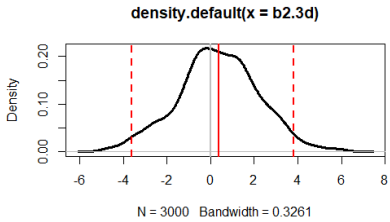


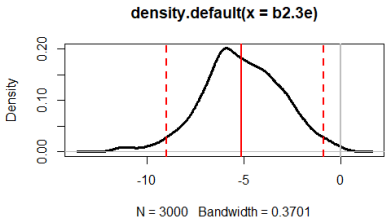
B2 Modelo 3



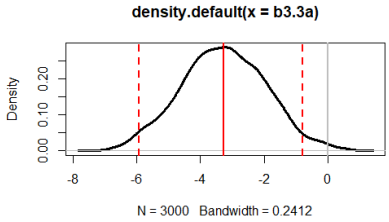


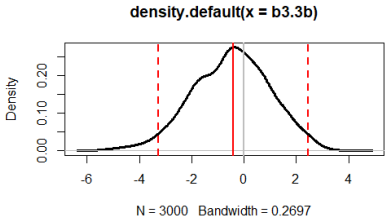


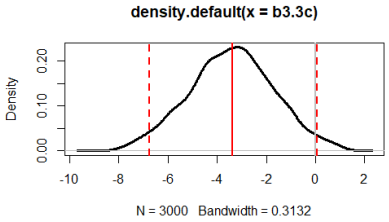


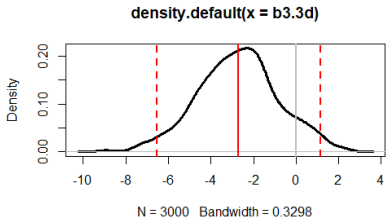


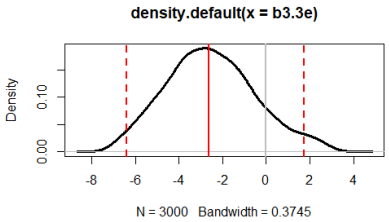
#B3 modelo 3


density.default(x = b3.3a)
Density
N = 3000 Bandwidth = 0.2412

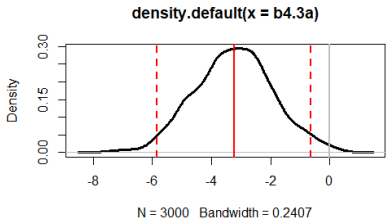

density.default(x = b3.3b)
Density
N = 3000 Bandwidth = 0.2697

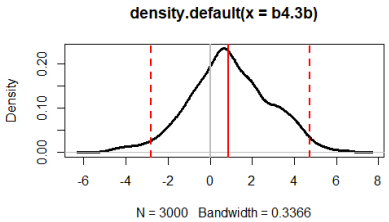

density.default(x = b3.3c)
Density
N = 3000 Bandwidth = 0.3132

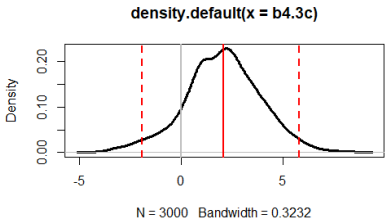

density.default(x = b3.3d)
Density
N = 3000 Bandwidth = 0.3298

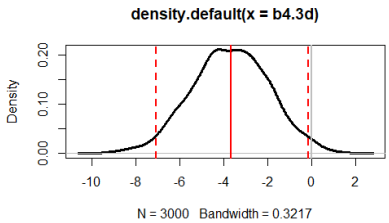

density.default(x = b3.3e)
Density
N = 3000 Bandwidth = 0.3745

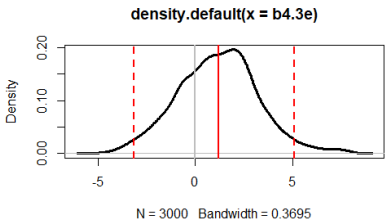
#B4 modelo 3


density.default(x = b4.3a)
Density
N = 3000 Bandwidth = 0.2407


density.default(x = b4.3b)
Density
N = 3000 Bandwidth = 0.3366


density.default(x = b4.3c)
Density
N = 3000 Bandwidth = 0.3232


density.default(x = b4.3d)
Density
N = 3000 Bandwidth = 0.3217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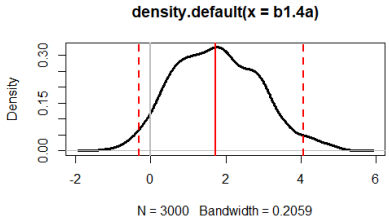
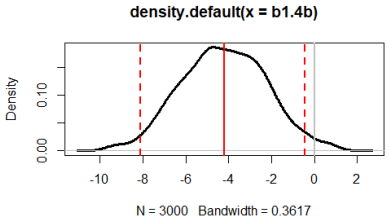
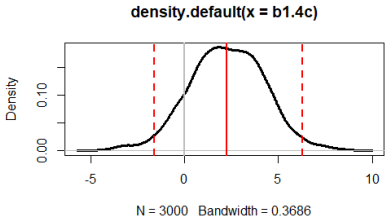
Density
N = 3000 Bandwidth = 0.3695


density.default(x = b1.4a)
Density
N = 3000 Bandwidth = 0.2059


density.default(x = b1.4b)
Density
N = 3000 Bandwidth = 0.3617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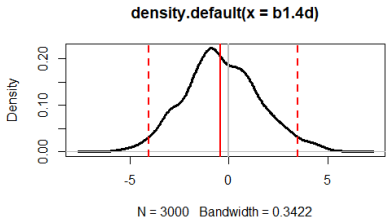
Density
N = 3000 Bandwidth = 0.3686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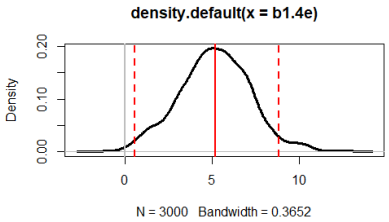
Density
N = 3000 Bandwidth = 0.3422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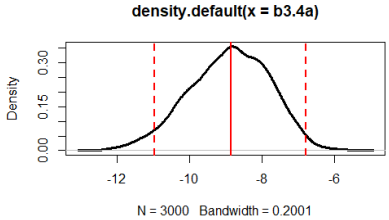
Density
N = 3000 Bandwidth = 0.3652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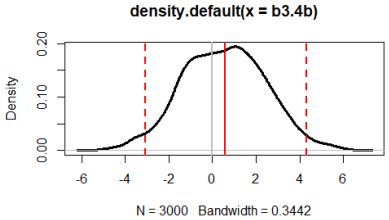
N = 3000 Bandwidth = 0.2001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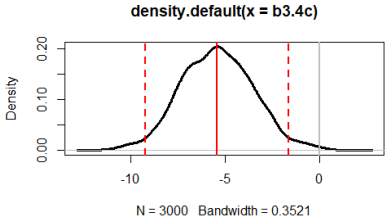
Density
N = 3000 Bandwidth = 0.3442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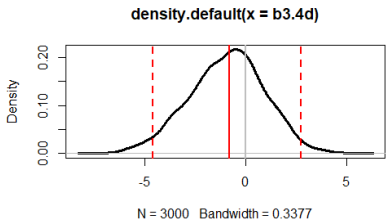
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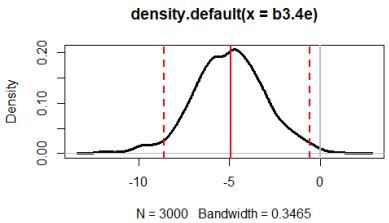
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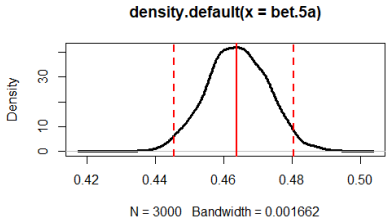
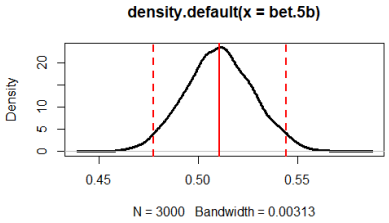
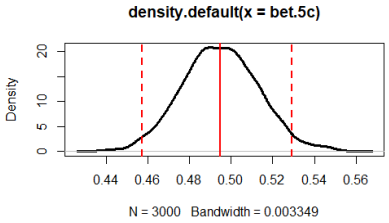
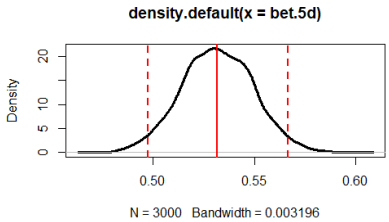
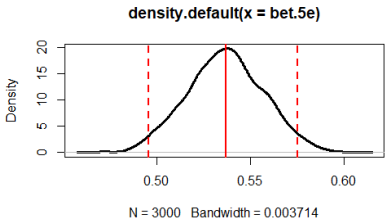
Betas modelo 5

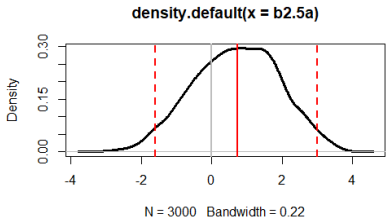


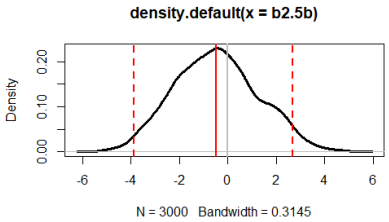


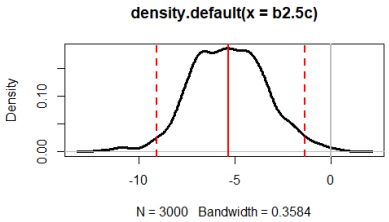


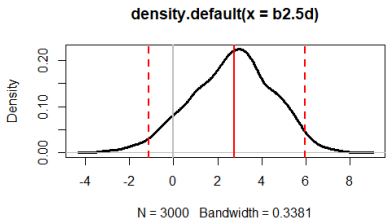


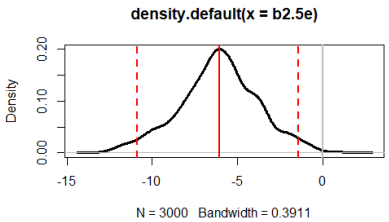




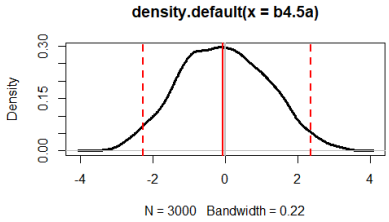


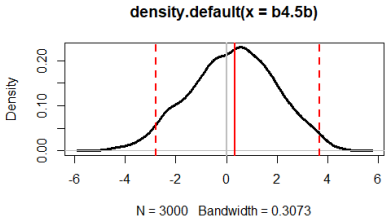


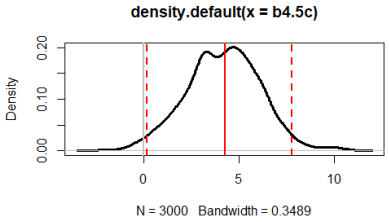


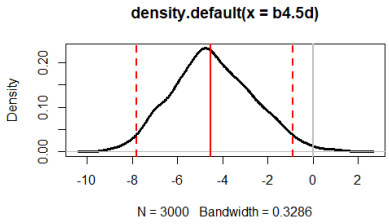


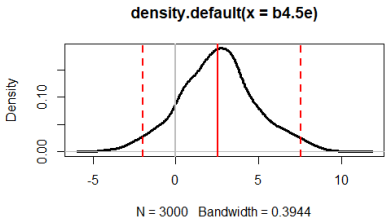
No hay beta3 (???)





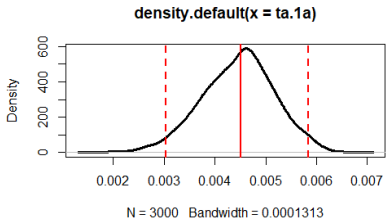


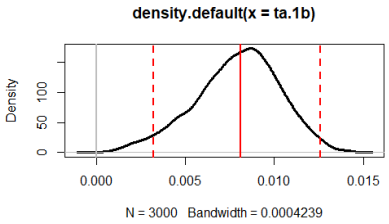


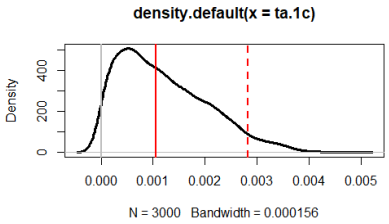


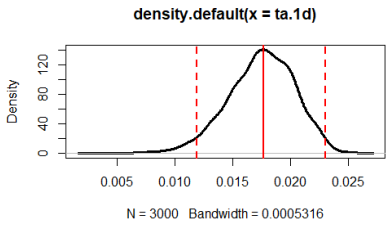
Tau

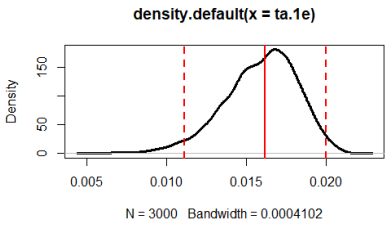
Tau modelo 1



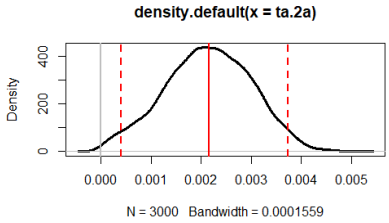


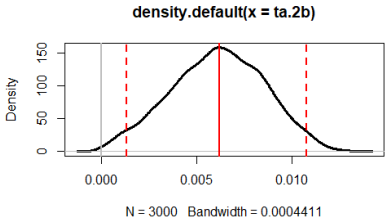


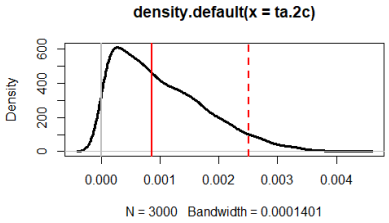


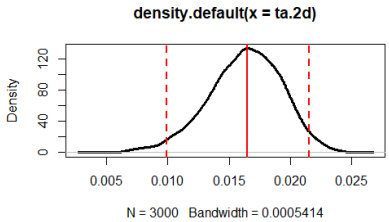


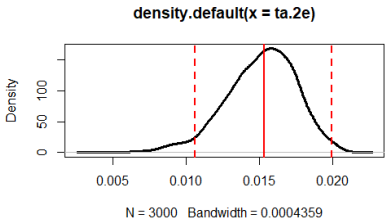
Tau Modelo 2



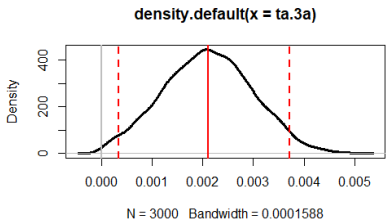


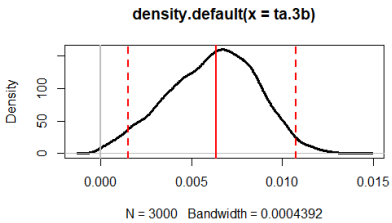


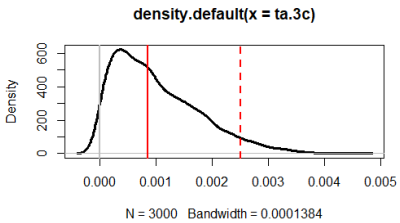


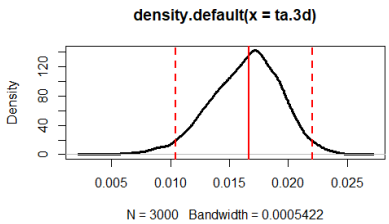


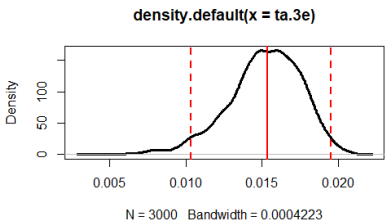
Tau modelo 3



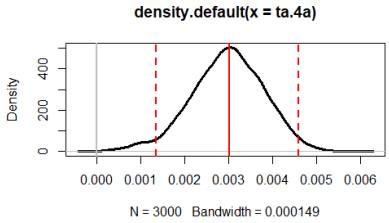


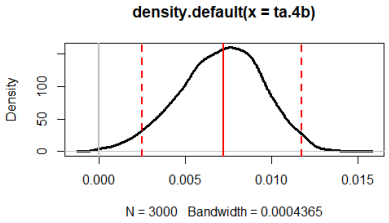


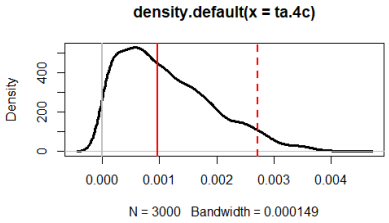


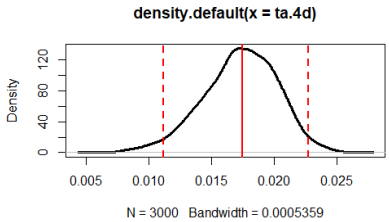


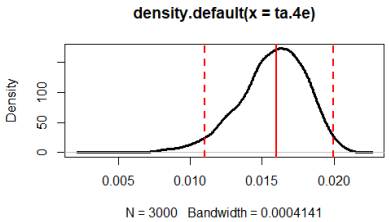
Tau modelo 4



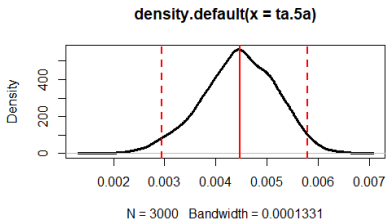


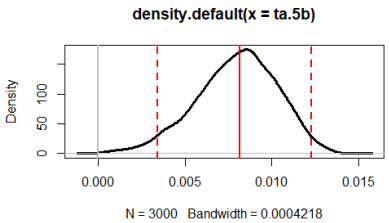


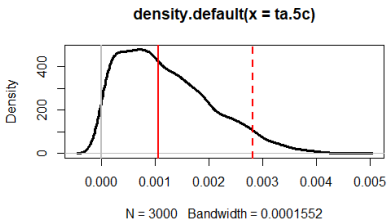


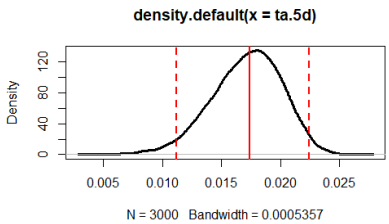


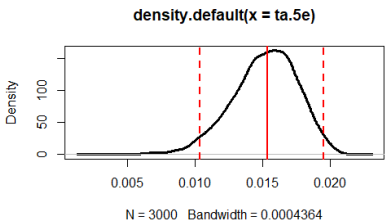
Tau modelo 5



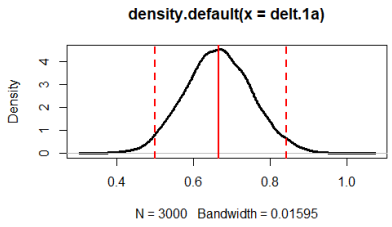


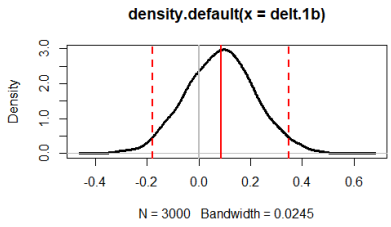


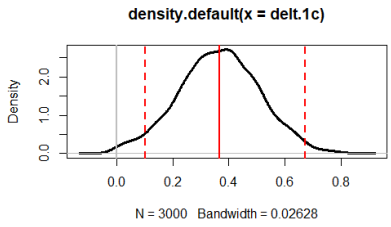


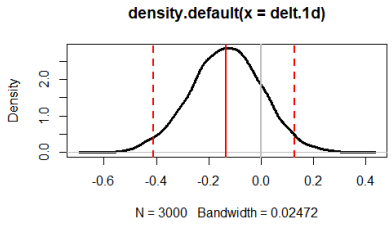


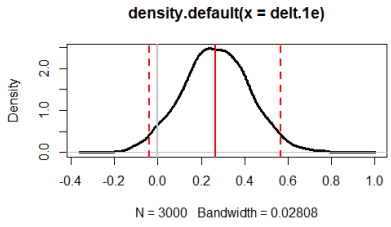
Delta











Delta modelo 1

[chantar toda la wea de graficos y tablas acá]

Ajuste de modelo DIC y lOO

Table 6: Resultados DIC

	Mascaras				
Modelo	A	B	C	D	E
1	-1367	-31	-76	25	-20
2	-2367	-168	-176	-16	-71
3	-2390	-166	-176	-19	-69
4	-1977	-92	-126	21	-22
5	-1369	-29	-82	7	-65

Table 7: Resultados LOO

	Mascaras				
Modelo	A	B	C	D	E
1	683	16	36	-13	8
2	1188	84	86	8	34
3	1195	82	86	9	33
4	988	46	62	-11	9
5	684	14	40	-4	31

Comentarios finales