Ministerio de Educación
Presidencia de la Nación

DiNIECE Dirección Nacional de Información y Evaluación de la Calidad Educativa

ANEXO C MODELOS MULTINIVEL:

LOS RECURSOS ESCOLARES

- Resultados **ONE 2010** -

Evaluación EDUCATIVA

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ANEXO C
MODELOS MULTINIVEL: LOS RECURSOS ESCOLARES

Contenido

Referencias de la siglas utilizadas en los modelos multinivel

Variables	***Preg***	***Siglas***
I. Cuestionario del alumno		
Variables de "control"		
Bienes y servicios en el hogar	*5*	*bien*
Hacinamiento habitacional	*3;4*	*hacina*
Educación familiar	*7,8*	*edufam*

Libros en la casa	*6*	*libro*
Alumno repitente		*repi*
Hacinamiento promedio		*haciesc*
Educación familiar promedio		*eduesc*
Cantidad promedio de libros		*libresc*
Cantidad promedio de repitencia		*repiesc*
Recursos (individual del alumno)		
Estado del aula	*13*	*infra*
Tenencia de útiles escolares	*10*	*utiles*
Tiene libro de lengua en casa	*16*	*liblen*
Recursos (promedio del aula)		
Estado del aula	*13*	*infresc*
Tenencia de útiles escolares	*10*	*ulilesc*
Tiene libro de lengua en casa	*16*	*liblesc*
II. Cuestionario del docente		
Características del docente		
Edad	*4*	*6*
Reviste como titular	*5*	*titu*
No responde preg. 5	*5*	*rev_nr*
Antigüedad en la docencia	*7*	*ant_doc*
Antigüedad docente de 6º	*8*	*ant_6*
Antigüedad docente en la escuela	*9*	*ant_esc*
Enseña sólo lengua	*10*	*solole*
Tiene otra actividad docente	*11-12*	*actdoc*
Tiene otra actividad no docente	*11-12*	*actnod*
Cursos de capacitación docente	*13*	*n_curs*
Tiene título profesional	*14*	*profesi*
Maestro/Normal/sin título	*14*	*normal*
No responde pregunta 14	*14*	*tit_nr*
Cursa carrera universitaria	*15-16*	*univ*
Cursa carrera no universitaria	*15-16*	*no_uni*
Disponibilidad de recursos		
Estado del aula	*18*	*est_au*
Medios y recursos en la escuela	*19*	*medios*
Tenencia de materiales por el alumno	*20*	*alumate*
Uso de medios y recursos		
Pedido de materiales por el maestro	*20*	*pid_mat*
Uso de libros de texto y guías de trabajo	*26*	*lec_lib*
Uso de videos, Internet, audios, programas	*26*	*lec_otr*
Uso de todos los medios o recursos	*26*	*lec_tod*

Uso de novelas o ficción para comprensión lectora	*27*	*tex_nov*
Uso de textos instructivos y periódicos para comprensión lectora	*27*	*tex_ins*
Uso de todos los textos para comprensión lectora	*27*	*tex_tod*

Modelo "vacío"

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons}$$

$$\beta_{0ijk} = 388.505(3.644) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[300.789(91.407)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[1883.039(52.961)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6537.502(35.785)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 824963.344(70393 of 70393 cases in use)

I. Modelo "control" (variables extra-escolares)

I.1. Modelo con indicadores individuales

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.074(0.020)(\text{bien-gm})_{ijk} + -4.202(0.309)(\text{hacina-gm})_{ijk} + 2.202(0.124)(\text{edufam-gm})_{ijk} + 3.686(0.270)(\text{libro-gm})_{ijk} + -34.306(0.788)\text{repi}_{ijk}$$

$$\beta_{0ijk} = 397.427(2.927) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[191.706(59.253)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[1284.629(38.712)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6325.598(34.618)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 821610.735(70393 of 70393 cases in use)

I.2. Modelo con indicadores de 'composición'

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + -0.072(0.021)(\text{bien-gm})_{ijk} + -3.853(0.308)(\text{hacina-gm})_{ijk} + 1.778(0.124)(\text{edufam-gm})_{ijk} + 3.361(0.270)(\text{libro-gm})_{ijk} + -33.093(0.787)\text{repi}_{ijk} + 1.540(0.051)(\text{biesc-gm})_{jk}$$

$$\beta_{0ijk} = 397.489(1.826) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[68.769(22.810)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[984.492(31.503)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6320.277(34.589)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 820801.149(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.562(0.089)(biesc\text{-}gm)_{jk} + -6.497(1.865)(haciesc\text{-}gm)_{jk} + 3.457(0.650)(eduesc\text{-}gm)_{jk} + 11.927(1.717)(libresc\text{-}gm)_{jk} + -7.305(4.444)(repiesc\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.739(1.828) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim N(0, \Omega_v) : \Omega_v = \left[69.451(22.845)\right]$

$\left[u_{0jk}\right] \sim N(0, \Omega_u) : \Omega_u = \left[919.300(29.945)\right]$

$\left[e_{0ijk}\right] \sim N(0, \Omega_e) : \Omega_e = \left[6320.194(34.588)\right]$

*-2*loglikelihood(IGLS Deviance)* = 820620.051(70393 of 70393 cases in use)

II. Características del docente

II.1. Modelos singulares

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 1.191(2.129)profesi_{jk} + -2.983(3.243)normal_{jk} + 1.114(3.025)no\_res_{jk}$

$\beta_{0ijk} = 388.391(3.692) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim N(0, \Omega_v) : \Omega_v = \left[301.391(92.489)\right]$

$\left[u_{0jk}\right] \sim N(0, \Omega_u) : \Omega_u = \left[1882.220(53.039)\right]$

$\left[e_{0ijk}\right] \sim N(0, \Omega_e) : \Omega_e = \left[6537.483(35.785)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824961.880(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 5.334(1.756)titu_{jk} + 4.467(2.866)rev\_mr_{jk}$

$\beta_{0ijk} = 385.277(3.827) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim N(0, \Omega_v) : \Omega_v = \left[306.912(93.893)\right]$

$\left[u_{0jk}\right] \sim N(0, \Omega_u) : \Omega_u = \left[1876.397(52.898)\right]$

$\left[e_{0ijk}\right] \sim N(0, \Omega_e) : \Omega_e = \left[6537.577(35.785)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824953.897(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.350(0.327)(\text{doc\_edad-gm})_{jk}$$
$$\beta_{0ijk} = 388.541(3.665) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[304.580(93.079)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[1882.128(53.036)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6537.506(35.785)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 824962.160(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.556(0.366)(\text{ant\_doc-gm})_{jk}$$
$$\beta_{0ijk} = 388.654(3.743) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[318.517(96.863)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[1870.933(52.768)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6537.523(35.785)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 824945.346(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.705(0.299)(\text{ant\_6-gm})_{jk}$$
$$\beta_{0ijk} = 388.642(3.687) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \left[308.510(94.051)\right]$$

$$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \left[1861.922(52.553)\right]$$

$$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \left[6537.623(35.786)\right]$$

*-2*loglikelihood(IGLS Deviance)* = 824931.079(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.009(0.265)(\text{ant\_esc-gm})_{jk}$$
$$\beta_{0ijk} = 388.683(3.765) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 322.455(97.970) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1873.029(52.819) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.508(35.785) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824948.878(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 23.451(1.985)\text{sololen}_{jk}$$
$$\beta_{0ijk} = 369.619(3.596) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 232.045(72.492) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1802.189(51.123) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.669(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824826.994(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 7.272(1.678)\text{actdoc}_{jk} + 6.706(4.193)\text{actnod}_{jk}$$
$$\beta_{0ijk} = 385.528(3.683) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 297.071(90.880) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1869.984(52.750) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.661(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824943.641(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 6.884(1.661)\text{actdoc}_{jk}$

$\beta_{0ijk} = 385.905(3.658) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 293.946(89.849) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1871.815(52.794) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6537.645(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824946.237(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 2.382(0.733)(\text{n\_curs-gm})_{jk}$

$\beta_{0ijk} = 388.383(3.715) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 313.065(95.525) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1862.698(53.202) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6534.767(36.211) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 804975.247(68692 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.191(2.129)\text{profesi}_{jk} + -2.983(3.243)\text{normal}_{jk} + 1.114(3.025)\text{tit\_nr}_{jk}$

$\beta_{0ijk} = 388.391(3.692) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 301.341(92.056) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1882.207(53.063) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6537.485(35.785) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824961.854(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 8.734(3.202)\text{univ}_{jk}$$
$$\beta_{0ijk} = 387.883(3.640) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 298.986(91.885) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1878.752(53.279) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.462(35.776) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824955.868(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 8.282(3.210)\text{univ}_{jk} + \text{-}5.432(2.985)\text{no\_uni}_{jk}$$
$$\beta_{0ijk} = 388.342(3.644) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 298.199(91.403) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1876.958(52.961) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.427(35.785) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824952.598(70393 of 70393 cases in use)

II.2. Modelos del conjunto: Características del docente

Antigüedad del docente

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.458(0.369)(\text{ant\_6-gm})_{jk} + 0.515(0.450)(\text{ant\_doc-gm})_{jk}$$
$$\beta_{0ijk} = 388.672(3.714) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 313.363(95.480) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1860.974(52.537) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.611(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824929.760(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.504(0.342)(\text{ant\_6-gm})_{jk} + 0.367(0.302)(\text{ant\_esc-gm})_{jk}$

$\beta_{0ijk} = 388.691(3.726) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 315.535(96.075) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1860.795(52.532) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6537.607(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824929.641(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.414(0.374)(\text{ant\_6-gm})_{jk} + 0.314(0.531)(\text{ant\_doc-gm})_{jk} + 0.255(0.355)(\text{ant\_esc-gm})_{jk}$

$\beta_{0ijk} = 388.694(3.731) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 316.373(96.310) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1860.560(52.527) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6537.605(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824929.244(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.610(0.328)(\text{ant\_6-gm})_{jk} + 1.517(1.915)\text{titu}_{jk} + 2.909(2.874)\text{rev\_nr}_{jk}$

$\beta_{0ijk} = 387.550(3.867) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 309.436(94.440) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1860.964(52.537) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6537.648(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824929.857(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 21.943(2.015)sololen_{jk} + 1.381(0.300)(ant\_6\text{-}gm)_{jk} + 5.310(1.661)actdoc_{jk} + 0.882(0.733)(n\_curs\text{-}gm)_{jk}$

$\beta_{0ijk} = 368.804(3.704) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 241.234(74.526) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 1768.345(50.950) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6535.099(36.212) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 804820.202(68692 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 22.544(1.979)sololen_{jk} + 1.442(0.294)(ant\_6\text{-}gm)_{jk} + 5.498(1.633)actdoc_{jk} + 7.578(3.136)univ_{jk}$

$\beta_{0ijk} = 367.849(3.647) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 233.392(72.430) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 1774.955(50.576) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6537.821(35.787) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824783.103(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 22.553(1.980)sololen_{jk} + 1.445(0.295)(ant\_6\text{-}gm)_{jk} + 5.810(1.629)actdoc_{jk}$

$\beta_{0ijk} = 368.263(3.648) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 234.192(72.999) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 1777.908(50.585) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6537.897(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824788.926(70393 of 70393 cases in use)

II.3. Modelos singulares con "control"

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.564(0.090)(biesc\text{-}gm)_{jk} + -6.488(1.866)(haciesc\text{-}gm)_{jk} + 3.458(0.650)(eduesc\text{-}gm)_{jk} + 11.927(1.717)(libresc\text{-}gm)_{jk} + -7.316(4.445)(repiesc\text{-}gm)_{jk} + -0.200(1.623)sololen_{jk}$

$\beta_{0ijk} = 397.901(2.252) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 69.480(22.863) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 919.304(29.945) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.191(34.588) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820620.069(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.454(0.800)repi_{ijk} + 0.558(0.089)(biesc\text{-}gm)_{jk} + -6.489(1.865)(haciesc\text{-}gm)_{jk} + 3.438(0.650)(eduesc\text{-}gm)_{jk} + 11.895(1.716)(libresc\text{-}gm)_{jk} + -7.294(4.443)(repiesc\text{-}gm)_{jk} + 0.326(0.228)(ant\_6\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.754(1.824) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim N(0, \Omega_v) : \Omega_v = \left[69.087(22.855)\right]$

$\left[u_{0jk}\right] \sim N(0, \Omega_u) : \Omega_u = \left[918.552(29.946)\right]$

$\left[e_{0ijk}\right] \sim N(0, \Omega_e) : \Omega_e = \left[6320.211(34.588)\right]$

*-2*loglikelihood(IGLS Deviance)* = 820618.007(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.560(0.089)(biesc\text{-}gm)_{jk} + -6.515(1.866)(haciesc\text{-}gm)_{jk} + 3.454(0.650)(eduesc\text{-}gm)_{jk} + 11.916(1.717)(libresc\text{-}gm)_{jk} + -7.356(4.447)(repiesc\text{-}gm)_{jk} + 0.446(1.261)actdoc_{jk}$

$\beta_{0ijk} = 397.571(1.892) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim N(0, \Omega_v) : \Omega_v = \left[69.707(22.930)\right]$

$\left[u_{0jk}\right] \sim N(0, \Omega_u) : \Omega_u = \left[919.220(29.948)\right]$

$\left[e_{0ijk}\right] \sim N(0, \Omega_e) : \Omega_e = \left[6320.197(34.588)\right]$

*-2*loglikelihood(IGLS Deviance)* = 820619.961(70393 of 70393 cases in use)

II.4. Modelos conjuntos con "control"

Ningún predictor ha resultados significativo individualmente.

III. Disponibilidad de recursos

III.1. Modelos singulares

III.1.1. Cuestionarios del alumno

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 6.594(0.360)(\text{utiles-gm})_{ijk}$

$\beta_{0ijk} = 388.633(3.568) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 288.475(88.246) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1787.348(50.769) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6520.711(35.693) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824632.145(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.365(0.016)(\text{infra-gm})_{ijk}$

$\beta_{0ijk} = 388.414(3.484) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 273.783(84.258) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1847.044(52.144) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6494.695(35.551) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824460.448(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 7.900(0.741)\text{liblen}_{ijk}$

$\beta_{0ijk} = 382.727(3.678) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 300.005(91.625) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 1850.833(52.282) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6531.570(35.753) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824850.054(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 5.047(0.366)(\text{utiles-gm})_{ijk} + 52.964(1.948)(\text{utilesc-gm})_{jk}$

$\beta_{0ijk} = 389.454(3.238) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 237.449(72.700) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1413.411(42.003) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6523.080(35.701) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 823963.491(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 6.098(0.749)\text{liblen}_{ijk} + 79.648(4.799)(\text{liblesc-gm})_{jk}$

$\beta_{0ijk} = 385.049(3.669) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 299.146(90.927) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1689.021(48.446) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6532.435(35.757) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824585.291(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.350(0.017)(\text{infra-gm})_{ijk} + 0.297(0.074)(\text{infresc-gm})_{jk}$

$\beta_{0ijk} = 388.336(3.374) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 255.715(79.299) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1837.800(51.922) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6494.750(35.551) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824444.360(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 58.019(1.913)(\text{utilesc-gm})_{jk}$$
$$\beta_{0ijk} = 389.455(3.238) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 237.446(72.617) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1412.315(41.936) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6541.696(35.805) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824153.625(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.646(0.072)(\text{infresc-gm})_{jk}$$
$$\beta_{0ijk} = 388.338(3.371) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 255.281(79.089) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1835.184(51.910) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.667(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824883.666(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 85.745(4.740)(\text{liblesc-gm})_{jk}$$
$$\beta_{0ijk} = 389.592(3.626) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 299.071(90.877) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1688.444(48.436) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6538.949(35.793) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824651.452(70393 of 70393 cases in use)

III.1.2. Cuestionarios del docente

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 2.210(0.177)(\text{est\_au-gm})_{jk}$

$\beta_{0ijk} = 388.589(3.152) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[221.352(68.810)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1791.077(50.887)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6538.021(35.787)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824811.059(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 2.583(0.306)(\text{medios-gm})_{jk}$

$\beta_{0ijk} = 388.558(3.399) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[259.808(80.293)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1840.069(52.030)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6537.749(35.787)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824892.893(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 2.221(0.145)(\text{alumate-gm})_{jk}$

$\beta_{0ijk} = 389.401(3.617) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[297.109(90.511)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1745.151(49.764)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6537.756(35.787)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824737.224(70393 of 70393 cases in use)

III.2. Modelos de conjuntos

III.2.1. Cuestionarios del alumno

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 0.319(0.065)(\text{infresc-gm})_{jk} + 49.883(2.076)(\text{utilesc-gm})_{jk} + 38.923(4.750)(\text{liblesc-gm})_{jk}$$

$$\beta_{0ijk} = 389.721(3.152) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 224.623(68.802) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1365.500(40.916) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.197(35.804) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824061.261(70393 of 70393 cases in use)

III.2.2. Cuestionarios del docente

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.925(0.148)(\text{alumate-gm})_{jk} + 1.753(0.180)(\text{est\_au-gm})_{jk} + 0.714(0.316)(\text{medios-gm})_{jk}$$

$$\beta_{0ijk} = 389.359(3.169) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 224.797(69.604) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1678.441(48.226) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6538.237(35.788) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824619.986(70393 of 70393 cases in use)

III.2.3. Alumno + Docente

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 48.188(2.069)(\text{utilesc-gm})_{jk} + 34.055(4.750)(\text{liblesc-gm})_{jk} + 1.234(0.135)(\text{alumate-gm})_{jk}$$

$$\beta_{0ijk} = 390.190(3.264) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 242.120(73.709) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1336.688(40.154) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.269(35.807) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824003.192(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 45.971(2.075)(utilesc\text{-}gm)_{jk} + 33.953(4.714)(liblesc\text{-}gm)_{jk} + 1.126(0.135)(alumate\text{-}gm)_{jk} + 1.201(0.159)(est\_au\text{-}gm)_{jk}$

$\beta_{0ijk} = 390.161(3.064) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 211.966(65.228) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1310.655(39.534) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.506(35.809) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 823947.031(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 45.398(2.083)(utilesc\text{-}gm)_{jk} + 33.595(4.711)(liblesc\text{-}gm)_{jk} + 1.134(0.135)(alumate\text{-}gm)_{jk} + 1.064(0.167)(est\_au\text{-}gm)_{jk} + 0.188(0.067)(infresc\text{-}gm)_{jk}$

$\beta_{0ijk} = 390.101(3.036) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 207.878(63.841) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1307.349(39.451) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.474(35.809) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 823939.143(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 45.250(2.081)(utilesc\text{-}gm)_{jk} + 34.042(4.710)(liblesc\text{-}gm)_{jk} + 1.057(0.138)(alumate\text{-}gm)_{jk} + 0.947(0.173)(est\_au\text{-}gm)_{jk} + 0.194(0.067)(infresc\text{-}gm)_{jk} + 0.740(0.286)(medios\text{-}gm)_{jk}$

$\beta_{0ijk} = 390.080(2.988) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 200.885(61.842) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1304.253(39.377) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.547(35.809) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 823932.474(70393 of 70393 cases in use)

III.3. Modelos singulares con “control”

III.3.1. Cuestionarios del alumno

Con fines de simplificación, ase presentan sólo las variables grupales

$$leng_{ijk} \sim N(XB,\ \Omega)$$

$$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.513(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.454(0.800)repi_{ijk} + 0.492(0.091)(biesc\text{-}gm)_{jk} + -5.912(1.870)(haciesc\text{-}gm)_{jk} + 3.454(0.649)(eduesc\text{-}gm)_{jk} + 11.434(1.720)(libresc\text{-}gm)_{jk} + -4.235(4.527)(repiesc\text{-}gm)_{jk} + 7.423(2.142)(utilesc\text{-}gm)_{jk}$$

$$\beta_{0ijk} = 397.736(1.871) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 73.264(24.019) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 914.063(29.869) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6320.363(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820608.095(70393 of 70393 cases in use)

$$leng_{ijk} \sim N(XB,\ \Omega)$$

$$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.514(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.543(0.089)(biesc\text{-}gm)_{jk} + -6.385(1.865)(haciesc\text{-}gm)_{jk} + 3.465(0.650)(eduesc\text{-}gm)_{jk} + 11.531(1.726)(libresc\text{-}gm)_{jk} + -6.734(4.452)(repiesc\text{-}gm)_{jk} + 8.287(4.123)(liblesc\text{-}gm)_{jk}$$

$$\beta_{0ijk} = 397.802(1.853) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 71.575(23.510) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 917.143(29.898) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6320.331(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820616.040(70393 of 70393 cases in use)

$$leng_{ijk} \sim N(XB,\ \Omega)$$

$$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.554(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.452(0.800)repi_{ijk} + 0.533(0.088)(biesc\text{-}gm)_{jk} + -6.201(1.847)(haciesc\text{-}gm)_{jk} + 3.696(0.644)(eduesc\text{-}gm)_{jk} + 12.113(1.698)(libresc\text{-}gm)_{jk} + -4.736(4.406)(repiesc\text{-}gm)_{jk} + 0.464(0.054)(infresc\text{-}gm)_{jk}$$

$$\beta_{0ijk} = 397.598(1.675) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 56.808(19.257) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 893.944(29.358) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6320.692(34.589) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820548.549(70393 of 70393 cases in use)

III.3.2. Cuestionario del docente

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.514(0.313)(hacina-gm)}_{ijk} + \\ & \text{1.553(0.127)(edufam-gm)}_{ijk} + \text{2.950(0.274)(libro-gm)}_{ijk} + \text{-32.452(0.800)repi}_{ijk} + \\ & \text{0.537(0.089)(biesc-gm)}_{jk} + \text{-6.354(1.863)(haciesc-gm)}_{jk} + \text{3.376(0.650)(eduesc-gm)}_{jk} + \\ & \text{11.705(1.715)(libresc-gm)}_{jk} + \text{-6.631(4.442)(repiesc-gm)}_{jk} + \text{0.423(0.119)(alumate-gm)}_{jk}\end{aligned}$$

$$\beta_{0ijk} = 397.851(1.847) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 71.134(23.323) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 914.869(29.842) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6320.137(34.587) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820607.370(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.514(0.313)(hacina-gm)}_{ijk} + \\ & \text{1.553(0.127)(edufam-gm)}_{ijk} + \text{2.951(0.274)(libro-gm)}_{ijk} + \text{-32.450(0.800)repi}_{ijk} + \\ & \text{0.537(0.089)(biesc-gm)}_{jk} + \text{-6.111(1.861)(haciesc-gm)}_{jk} + \text{3.491(0.648)(eduesc-gm)}_{jk} + \\ & \text{11.532(1.713)(libresc-gm)}_{jk} + \text{-6.826(4.430)(repiesc-gm)}_{jk} + \text{0.674(0.139)(est\_au-gm)}_{jk}\end{aligned}$$

$$\beta_{0ijk} = 397.737(1.769) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 64.375(21.428) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 911.135(29.755) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6320.319(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820596.572(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.515(0.313)(hacina-gm)}_{ijk} + \\ & \text{1.553(0.127)(edufam-gm)}_{ijk} + \text{2.951(0.274)(libro-gm)}_{ijk} + \text{-32.452(0.800)repi}_{ijk} + \\ & \text{0.548(0.089)(biesc-gm)}_{jk} + \text{-6.486(1.864)(haciesc-gm)}_{jk} + \text{3.460(0.650)(eduesc-gm)}_{jk} + \\ & \text{11.889(1.716)(libresc-gm)}_{jk} + \text{-7.206(4.442)(repiesc-gm)}_{jk} + \text{0.417(0.236)(medios-gm)}_{jk}\end{aligned}$$

$$\beta_{0ijk} = 397.741(1.816) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} 68.408(22.593) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} 918.025(29.916) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} 6320.271(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820616.955(70393 of 70393 cases in use)

III.4. Modelos conjuntos con “control”

III.4.1. Cuestionario del alumno

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.514(0.313)(hacina-gm)}_{ijk} + \text{1.553(0.127)(edufam-gm)}_{ijk} + \\ & \text{2.949(0.274)(libro-gm)}_{ijk} + \text{-32.453(0.800)repi}_{ijk} + \text{0.489(0.090)(biesc-gm)}_{jk} + \text{-5.836(1.854)(haciesc-gm)}_{jk} + \\ & \text{3.684(0.643)(eduesc-gm)}_{jk} + \text{11.789(1.702)(libresc-gm)}_{jk} + \text{-2.868(4.486)(repiesc-gm)}_{jk} + \\ & \text{4.769(2.145)(utilesc-gm)}_{jk} + \text{0.445(0.055)infresc}_{jk}\end{aligned}$$

$$\beta_{0ijk} = \text{371.673(3.649)} + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} \text{59.973(20.183)} \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} \text{891.531(29.298)} \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} \text{6320.782(34.590)} \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820543.640(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.514(0.313)(hacina-gm)}_{ijk} + \text{1.554(0.127)(edufam-gm)}_{ijk} + \\ & \text{2.950(0.274)(libro-gm)}_{ijk} + \text{-32.453(0.800)repi}_{ijk} + \text{0.483(0.090)(biesc-gm)}_{jk} + \text{-5.807(1.853)(haciesc-gm)}_{jk} + \\ & \text{3.685(0.643)(eduesc-gm)}_{jk} + \text{11.596(1.710)(libresc-gm)}_{jk} + \text{-2.729(4.486)(repiesc-gm)}_{jk} + \\ & \text{4.346(2.178)(utilesc-gm)}_{jk} + \text{0.443(0.055)infresc}_{jk} + \text{4.658(4.150)(liblesc-gm)}_{jk}\end{aligned}$$

$$\beta_{0ijk} = \text{371.841(3.653)} + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} \text{60.423(20.045)} \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} \text{890.796(29.283)} \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} \text{6320.849(34.591)} \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820542.375(70393 of 70393 cases in use)

III.4.2. Cuestionario del docente

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\begin{aligned}\text{leng}_{ijk} = {} & \beta_{0ijk}\text{cons} + \text{-0.050(0.021)(bien-gm)}_{ijk} + \text{-3.513(0.313)(hacina-gm)}_{ijk} + \text{1.553(0.127)(edufam-gm)}_{ijk} + \\ & \text{2.951(0.274)(libro-gm)}_{ijk} + \text{-32.449(0.800)repi}_{ijk} + \text{0.516(0.089)(biesc-gm)}_{jk} + \text{-6.003(1.859)(haciesc-gm)}_{jk} + \\ & \text{3.415(0.648)(eduesc-gm)}_{jk} + \text{11.354(1.711)(libresc-gm)}_{jk} + \text{-6.242(4.429)(repiesc-gm)}_{jk} + \\ & \text{0.639(0.139)(est\_au-gm)}_{jk} + \text{0.380(0.119)(alumate-gm)}_{jk}\end{aligned}$$

$$\beta_{0ijk} = \text{397.837(1.787)} + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} \text{65.958(21.799)} \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} \text{907.589(29.668)} \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} \text{6320.261(34.588)} \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820586.296(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.513(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.449(0.800)repi_{ijk} + 0.516(0.089)(biesc\text{-}gm)_{jk} + -6.001(1.859)(haciesc\text{-}gm)_{jk} + 3.414(0.648)(eduesc\text{-}gm)_{jk} + 11.353(1.711)(libresc\text{-}gm)_{jk} + -6.241(4.429)(repiesc\text{-}gm)_{jk} + 0.643(0.144)(est\_au\text{-}gm)_{jk} + 0.382(0.121)(alumate\text{-}gm)_{jk} + -0.023(0.248)(medios\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.837(1.788) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 66.003(21.824) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 907.592(29.666) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.259(34.588) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820586.312(70393 of 70393 cases in use)

III.4.3. Cuestionario del docente y del alumno

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.514(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.451(0.800)repi_{ijk} + 0.522(0.088)(biesc\text{-}gm)_{jk} + -6.034(1.847)(haciesc\text{-}gm)_{jk} + 3.694(0.643)(eduesc\text{-}gm)_{jk} + 11.892(1.699)(libresc\text{-}gm)_{jk} + -4.733(4.402)(repiesc\text{-}gm)_{jk} + 0.345(0.145)(est\_au\text{-}gm)_{jk} + 0.422(0.057)(infresc\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.611(1.665) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 56.018(18.971) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 892.010(29.308) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.712(34.590) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820542.855(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.514(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.450(0.800)repi_{ijk} + 0.501(0.088)(biesc\text{-}gm)_{jk} + -5.927(1.845)(haciesc\text{-}gm)_{jk} + 3.616(0.643)(eduesc\text{-}gm)_{jk} + 11.719(1.698)(libresc\text{-}gm)_{jk} + -4.154(4.401)(repiesc\text{-}gm)_{jk} + 0.311(0.145)(est\_au\text{-}gm)_{jk} + 0.421(0.057)(infresc\text{-}gm)_{jk} + 0.374(0.118)(alumate\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.707(1.679) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 57.167(19.214) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 888.563(29.215) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.665(34.590) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820532.741(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + \text{-0.051(0.021)(bien-gm)}_{ijk} + \text{-3.513(0.313)(hacina-gm)}_{ijk} + \text{1.553(0.127)(edufam-gm)}_{ijk} + \text{2.949(0.274)(libro-gm)}_{ijk} + \text{-32.450(0.800)repi}_{ijk} + \text{0.460(0.090)(biesc-gm)}_{jk} + \text{-5.582(1.852)(haciesc-gm)}_{jk} + \text{3.607(0.643)(eduesc-gm)}_{jk} + \text{11.414(1.702)(libresc-gm)}_{jk} + \text{-2.394(4.480)(repiesc-gm)}_{jk} + \text{0.311(0.145)(est\_au-gm)}_{jk} + \text{0.403(0.058)(infresc-gm)}_{jk} + \text{0.366(0.118)(alumate-gm)}_{jk} + \text{4.530(2.142)(utilesc-gm)}_{jk}$$

$$\beta_{0ijk} = \text{397.709(1.717)} + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} \text{60.250(20.076)} \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} \text{886.320(29.161)} \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} \text{6320.758(34.590)} \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820528.329(70393 of 70393 cases in use)

IV. Uso de recursos

IV.1. Modelos singulares

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$

$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + \text{4.137(0.501)(pid\_mat-gm)}_{jk}$$

$$\beta_{0ijk} = \text{388.960(3.688)} + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \begin{bmatrix} \text{308.886(94.080)} \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \begin{bmatrix} \text{1840.975(52.051)} \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \begin{bmatrix} \text{6537.510(35.785)} \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824895.845(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 4.641(0.771)(\text{lec\_lib-gm})_{jk}$

$\beta_{0ijk} = 388.528(3.616) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[296.227(90.607)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1860.449(52.517)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6537.571(35.786)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824927.255(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 2.203(0.298)(\text{lec\_otr-gm})_{jk}$

$\beta_{0ijk} = 388.498(3.416) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[262.477(81.107)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1850.745(52.285)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6537.634(35.786)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824909.394(70393 of 70393 cases in use)

$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$

$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.649(0.192)(\text{lec\_tod-gm})_{jk}$

$\beta_{0ijk} = 388.592(3.446) + v_{0k} + u_{0jk} + e_{0ijk}$

$\left[v_{0k}\right] \sim \text{N}(0,\ \Omega_v)\ :\ \Omega_v = \left[267.455(82.455)\right]$

$\left[u_{0jk}\right] \sim \text{N}(0,\ \Omega_u)\ :\ \Omega_u = \left[1838.889(52.002)\right]$

$\left[e_{0ijk}\right] \sim \text{N}(0,\ \Omega_e)\ :\ \Omega_e = \left[6537.662(35.786)\right]$

*-2*loglikelihood(IGLS Deviance)* = 824890.715(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 4.413(0.511)(\text{tex\_nov-gm})_{jk}$$
$$\beta_{0ijk} = 388.438(3.309) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 245.320(76.292) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1839.953(52.026) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.605(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824889.948(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.107(0.409)(\text{tex\_ins-gm})_{jk}$$
$$\beta_{0ijk} = 388.573(3.647) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 301.330(91.412) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1878.256(53.072) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.535(35.785) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824956.020(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 1.602(0.225)(\text{tex\_tod-gm})_{jk}$$
$$\beta_{0ijk} = 388.592(3.497) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 275.902(84.884) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1852.375(52.324) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.607(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824912.923(70393 of 70393 cases in use)

IV.2. Modelos de conjuntos

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 4.617(0.560)(\text{tex\_nov-gm})_{jk} + \text{-}0.393(0.444)(\text{tex\_ins-gm})_{jk}$$
$$\beta_{0ijk} = 388.411(3.293) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 242.834(75.789) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1839.613(52.041) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.607(35.785) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824889.152(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 3.898(0.799)(\text{tex\_nov-gm})_{jk} + 0.293(0.350)(\text{tex\_tod-gm})_{jk}$$
$$\beta_{0ijk} = 388.461(3.321) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 247.180(76.295) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1839.361(52.027) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.615(35.785) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824889.272(70393 of 70393 cases in use)

$$\text{leng}_{ijk} \sim \text{N}(XB,\ \Omega)$$
$$\text{leng}_{ijk} = \beta_{0ijk}\text{cons} + 3.418(0.793)(\text{lec\_lib-gm})_{jk} + 1.864(0.308)(\text{lec\_otr-gm})_{jk}$$
$$\beta_{0ijk} = 388.516(3.431) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim \text{N}(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 265.082(81.776) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim \text{N}(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1839.110(52.014) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim \text{N}(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6537.659(35.786) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 824890.875(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 2.514(0.804)(lec\_lib\text{-}gm)_{jk} + 1.365(0.318)(lec\_otr\text{-}gm)_{jk} + 3.259(0.546)(tex\_nov\text{-}gm)_{jk}$

$\beta_{0ijk} = 388.464(3.242) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 235.022(73.079) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 1819.070(51.541) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 6537.688(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824855.473(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB, \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + 2.330(0.800)(lec\_lib\text{-}gm)_{jk} + 1.097(0.319)(lec\_otr\text{-}gm)_{jk} + 2.848(0.547)(tex\_nov\text{-}gm)_{jk} + 3.099(0.510)(pid\_mat\text{-}gm)_{jk}$

$\beta_{0ijk} = 388.809(3.335) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0, \Omega_v) : \Omega_v = \begin{bmatrix} 249.713(76.784) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0, \Omega_u) : \Omega_u = \begin{bmatrix} 1796.292(51.004) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0, \Omega_e) : \Omega_e = \begin{bmatrix} 6537.673(35.786) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 824818.871(70393 of 70393 cases in use)

IV.3. Modelos singulares con “control”

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.514(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.559(0.089)(biesc\text{-}gm)_{jk} + -6.487(1.865)(haciesc\text{-}gm)_{jk} + 3.445(0.650)(eduesc\text{-}gm)_{jk} + 11.942(1.717)(libresc\text{-}gm)_{jk} + -7.219(4.445)(repiesc\text{-}gm)_{jk} + 0.504(0.590)(lec\_lib\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.736(1.829) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 69.526(22.929) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 918.885(29.947) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.234(34.588) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820619.344(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.454(0.800)repi_{ijk} + 0.549(0.089)(biesc\text{-}gm)_{jk} + -6.454(1.864)(haciesc\text{-}gm)_{jk} + 3.474(0.650)(eduesc\text{-}gm)_{jk} + 11.934(1.715)(libresc\text{-}gm)_{jk} + -7.015(4.444)(repiesc\text{-}gm)_{jk} + 0.436(0.229)(lec\_otr\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.731(1.805) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 67.389(22.290) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 918.071(29.916) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.241(34.588) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820616.443(70393 of 70393 cases in use)

$leng_{ijk} \sim N(XB,\ \Omega)$

$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.452(0.800)repi_{ijk} + 0.556(0.089)(biesc\text{-}gm)_{jk} + -6.462(1.864)(haciesc\text{-}gm)_{jk} + 3.455(0.650)(eduesc\text{-}gm)_{jk} + 11.692(1.718)(libresc\text{-}gm)_{jk} + -7.060(4.442)(repiesc\text{-}gm)_{jk} + 0.915(0.394)(tex\_nov\text{-}gm)_{jk}$

$\beta_{0ijk} = 397.719(1.806) + v_{0k} + u_{0jk} + e_{0ijk}$

$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) : \Omega_v = \begin{bmatrix} 67.486(22.318) \end{bmatrix}$

$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) : \Omega_u = \begin{bmatrix} 917.615(29.906) \end{bmatrix}$

$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) : \Omega_e = \begin{bmatrix} 6320.195(34.588) \end{bmatrix}$

*-2*loglikelihood(IGLS Deviance)* = 820614.658(70393 of 70393 cases in use)

$$leng_{ijk} \sim N(XB,\ \Omega)$$
$$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.514(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.951(0.274)(libro\text{-}gm)_{ijk} + -32.453(0.800)repi_{ijk} + 0.558(0.089)(biesc\text{-}gm)_{jk} + -6.501(1.865)(haciesc\text{-}gm)_{jk} + 3.451(0.650)(eduesc\text{-}gm)_{jk} + 11.912(1.717)(libresc\text{-}gm)_{jk} + -7.219(4.446)(repiesc\text{-}gm)_{jk} + 0.264(0.389)(pid\_mat\text{-}gm)_{jk}$$
$$\beta_{0ijk} = 397.760(1.834) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 69.907(23.057) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 919.084(29.943) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6320.196(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820619.639(70393 of 70393 cases in use)

IV.4. Modelos conjuntos con "control"

$$leng_{ijk} \sim N(XB,\ \Omega)$$
$$leng_{ijk} = \beta_{0ijk}cons + -0.050(0.021)(bien\text{-}gm)_{ijk} + -3.515(0.313)(hacina\text{-}gm)_{ijk} + 1.553(0.127)(edufam\text{-}gm)_{ijk} + 2.950(0.274)(libro\text{-}gm)_{ijk} + -32.452(0.800)repi_{ijk} + 0.548(0.089)(biesc\text{-}gm)_{jk} + -6.438(1.864)(haciesc\text{-}gm)_{jk} + 3.467(0.649)(eduesc\text{-}gm)_{jk} + 11.737(1.718)(libresc\text{-}gm)_{jk} + -6.898(4.442)(repiesc\text{-}gm)_{jk} + 0.760(0.412)(tex\_nov\text{-}gm)_{jk} + 0.306(0.239)(lec\_otr\text{-}gm)_{jk}$$
$$\beta_{0ijk} = 397.717(1.793) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 66.402(21.986) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 917.042(29.891) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6320.226(34.588) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 820613.088(70393 of 70393 cases in use)

V. Conjunto de todos los indicadores de recursos

$$leng_{ijk} \sim N(XB,\ \Omega)$$
$$leng_{ijk} = \beta_{0ijk}cons + 0.657(0.260)(ant\_6\text{-}gm)_{jk} + 8.605(1.798)sololen_{jk} + 3.023(1.434)actdoc_{jk} + 5.810(2.752)univ_{jk} + 0.875(0.172)(est\_au\text{-}gm)_{jk} + 0.586(0.296)(medios\text{-}gm)_{jk} + 1.414(0.201)(alumate\text{-}gm)_{jk} + 0.215(0.066)(infresc\text{-}gm)_{jk} + 42.579(2.099)(utilesc\text{-}gm)_{jk} + 31.019(4.684)(liblesc\text{-}gm)_{jk} + -2.150(0.650)(pid\_mat\text{-}gm)_{jk} + -0.099(0.704)(lec\_lib\text{-}gm)_{jk} + -0.010(0.291)(lec\_otr\text{-}gm)_{jk} + 1.842(0.480)(tex\_nov\text{-}gm)_{jk}$$
$$\beta_{0ijk} = 381.429(3.148) + v_{0k} + u_{0jk} + e_{0ijk}$$

$$\begin{bmatrix} v_{0k} \end{bmatrix} \sim N(0,\ \Omega_v) \ :\ \Omega_v = \begin{bmatrix} 166.741(52.005) \end{bmatrix}$$

$$\begin{bmatrix} u_{0jk} \end{bmatrix} \sim N(0,\ \Omega_u) \ :\ \Omega_u = \begin{bmatrix} 1273.004(38.637) \end{bmatrix}$$

$$\begin{bmatrix} e_{0ijk} \end{bmatrix} \sim N(0,\ \Omega_e) \ :\ \Omega_e = \begin{bmatrix} 6542.615(35.809) \end{bmatrix}$$

*-2*loglikelihood(IGLS Deviance)* = 823860.790(70393 of 70393 cases in use)