Model sequence report

Contents

The data for the models was derived for the initial dataset **dsL**:

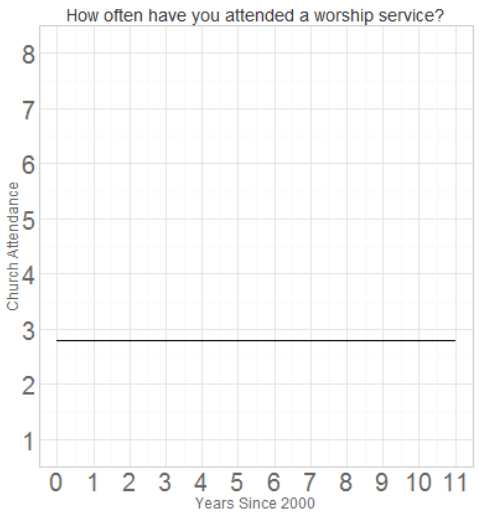
```
numID<- 9022 # highest id value (max = 9022)
### Define the data that will populate the model
ds<- dsL %>%  # chose conditions to apply in creating dataset for modeling
  dplyr::filter(id < numID) %.% # 1:9022
  dplyr::filter(year %in% c(2000:2011)) %.% # 1997:2011
  dplyr::filter(sample %in% c(1)) %.% # 0-Oversample; 1-Cross-Sectional
  dplyr::filter(race %in% c(4)) %.% # 1-Black; 2-Hispanis; 3-Mixed; 4-White
  dplyr::filter(byear %in% c(1980:1984)) %.% # birth year 1980:1984
  dplyr::filter(ave(!is.na(attend), id, FUN = all)) %.% # only complete trajectories
  dplyr::mutate( # compute new variables
    age= year-byear, # definition of age to be used in the model
    timec=year-2000, # metric of time is rounds of NSLY97 in years, centered at 2000
    timec2= timec^2,
    timec3= timec^3,
    #         timec= age-16, # metric of time is bilogical age in years, centered at 16
    #         timec2= timec^2,
    #         timec3= timec^3,#
    cohort=byear-1980) %.% # age difference, years younger (unit - 1 cohort away)
  dplyr::select( # assemble the dataset for modeling
    id, sample, race, byear,cohort, # Time Invariant variables
    year,
    age, timec,timec2,timec3, attend)  # Time Variant variables
```

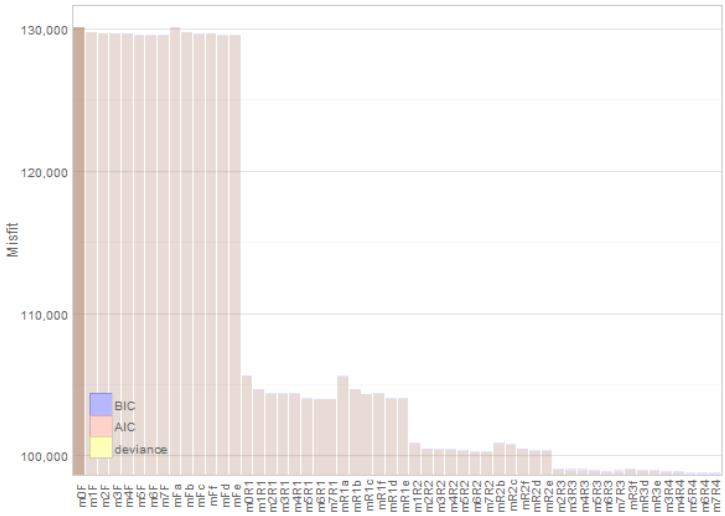
0.1 m0F – Fixed only

$$y_{ti} = \beta_{0i} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.80	0.01	251.55		0.00				1.96
timec					0.00				1.96
timec2									
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





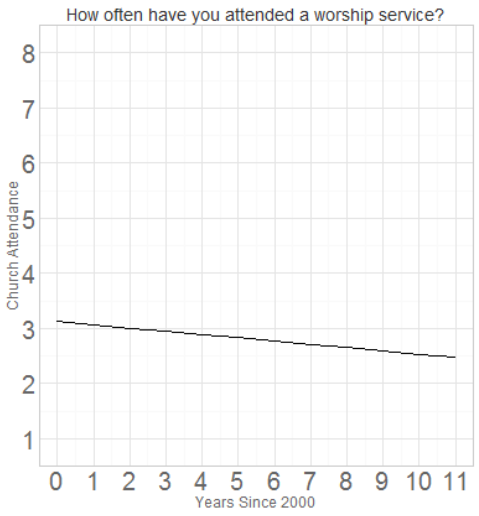
0.2 m1F

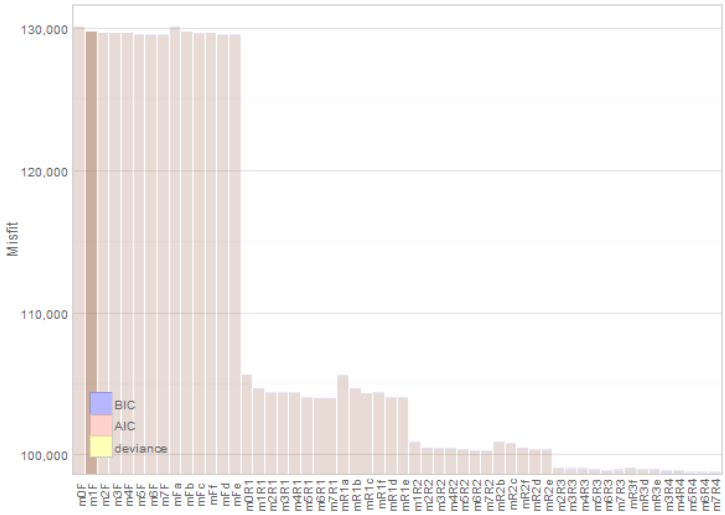
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00}$$

$$\beta_{1i} = \gamma_{10}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.12	0.02	149.89		0.00				1.95
timec	-0.06	0.00	-18.24		0.00				1.95
timec2									
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.3 m2F

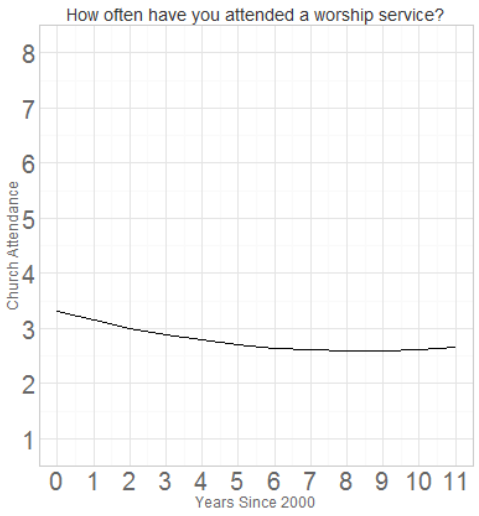
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

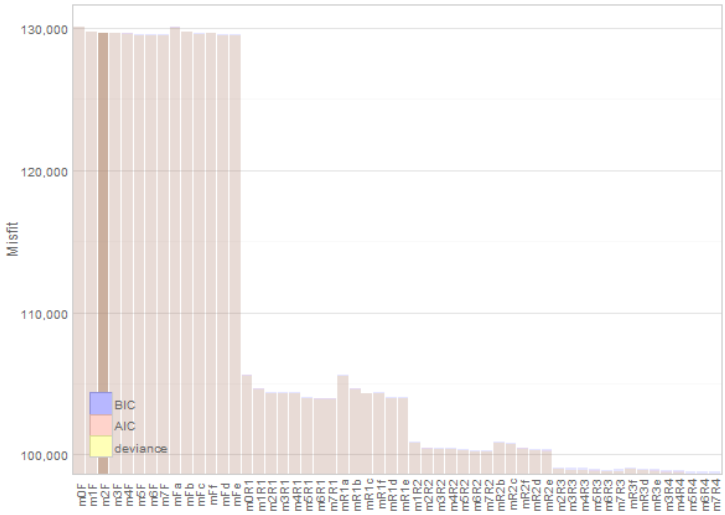
$$\beta_{0i} = \gamma_{00}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.32	0.03	117.01		0.00				1.95
timec	-0.17	0.01	-14.49		0.00				1.95
timec2	0.01	0.00	9.96		0.00				1.95
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.4 m3F

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

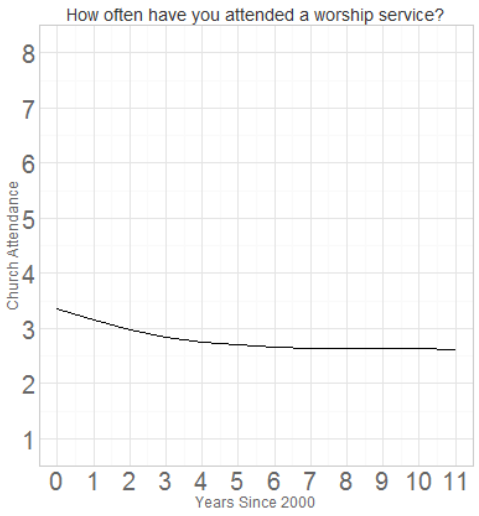
$$\beta_{0i} = \gamma_{00}$$

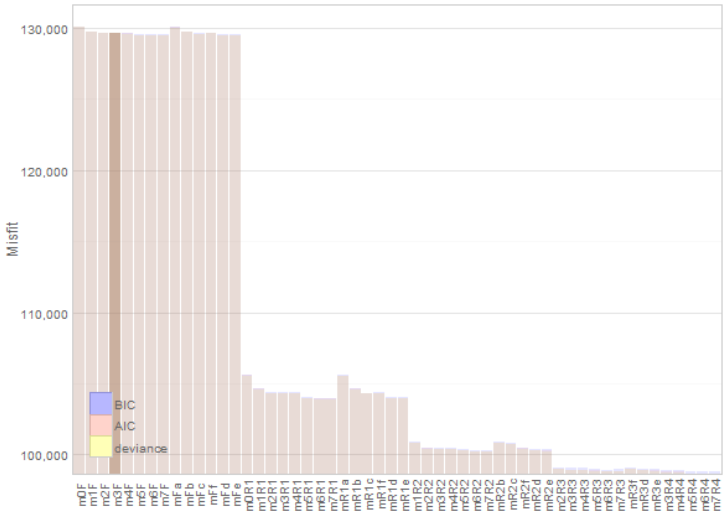
$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.37	0.03	100.87		0.00				1.95
timec	-0.24	0.03	-8.87		0.00				1.95
timec2	0.03	0.01	4.55		0.00				1.95
timec3	-0.00	0.00	-2.84		0.00				1.95
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.5 m4F

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

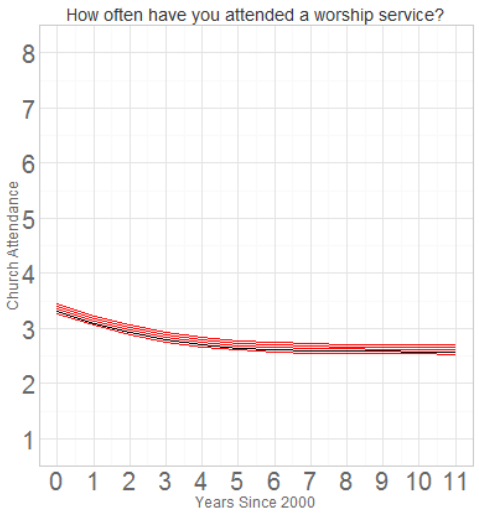
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

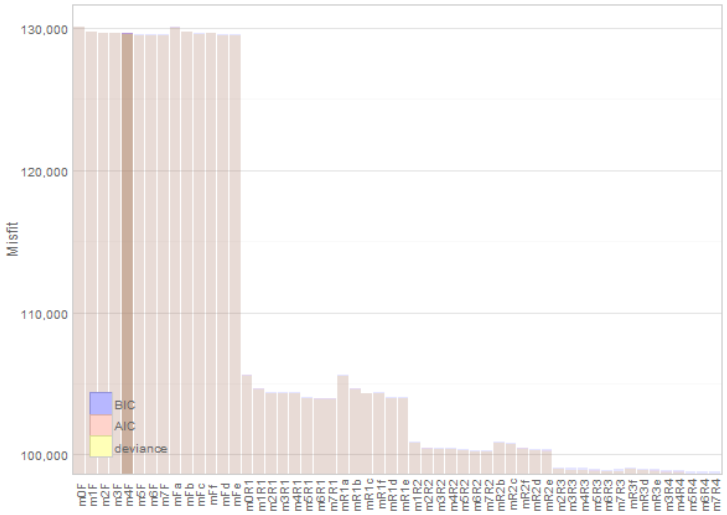
$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.27	0.04	87.84		0.00				1.95
timec	-0.24	0.03	-8.87		0.00				1.95
timec2	0.03	0.01	4.55		0.00				1.95
timec3	-0.00	0.00	-2.84		0.00				1.95
cohort	0.04	0.01	5.48		0.00				1.95
timec:cohort									
timec2:cohort									
timec3:cohort									





0.6 m5F

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

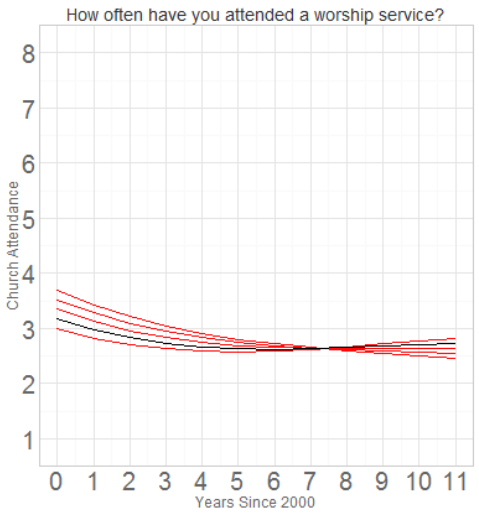
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

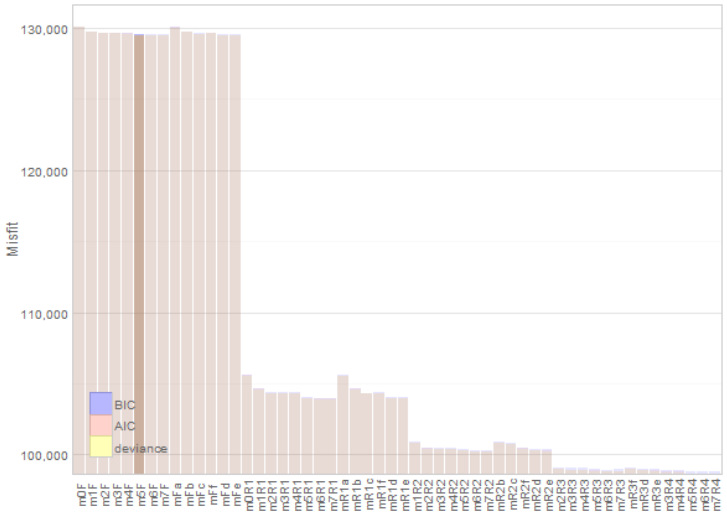
$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value
(Intercept)	3.00	0.05	65.59
timec	-0.19	0.03	-6.93
timec2	0.03	0.01	4.56
timec3	-0.00	0.00	-2.85
cohort	0.18	0.01	11.84
timec:cohort	-0.02	0.00	-10.54
timec2:cohort			
timec3:cohort			

sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
	0.00				1.94
	0.00				1.94
	0.00				1.94
	0.00				1.94
	0.00				1.94
	0.00				1.94





0.7 m6F

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

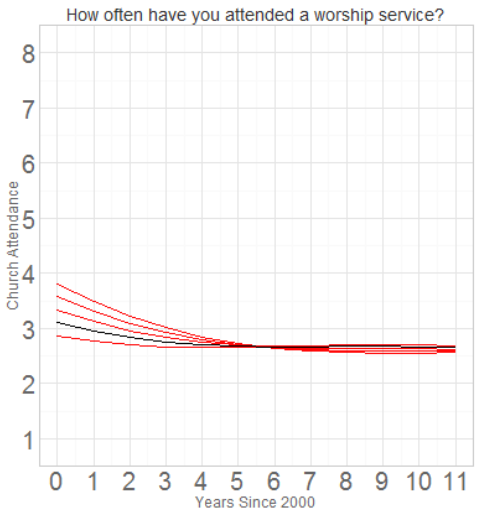
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

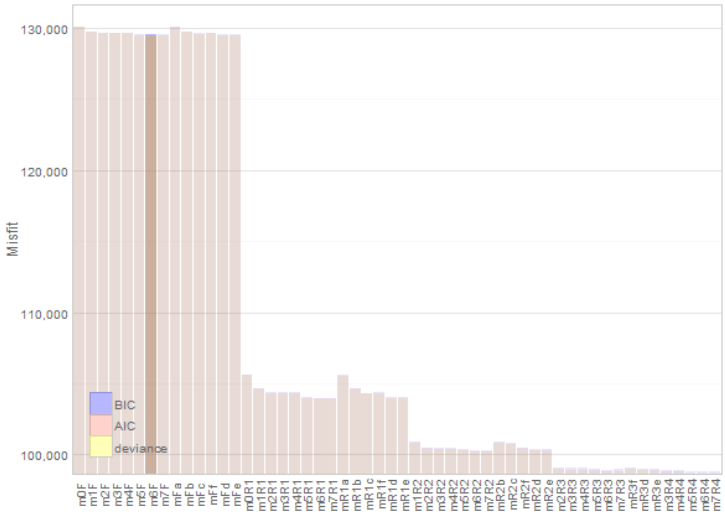
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.86	0.05	53.03		0.00				1.94
timec	-0.11	0.03	-3.50		0.00				1.94
timec2	0.02	0.01	3.25		0.00				1.94
timec3	-0.00	0.00	-2.85		0.00				1.94
cohort	0.24	0.02	11.76		0.00				1.94
timec:cohort	-0.06	0.01	-7.17		0.00				1.94
timec2:cohort	0.00	0.00	4.51		0.00				1.94
timec3:cohort									





0.8 m7F

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

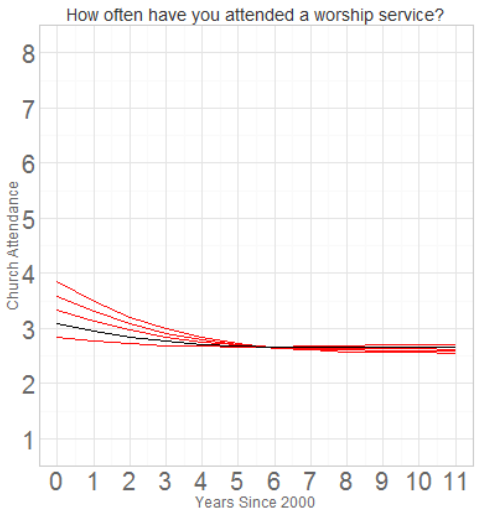
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

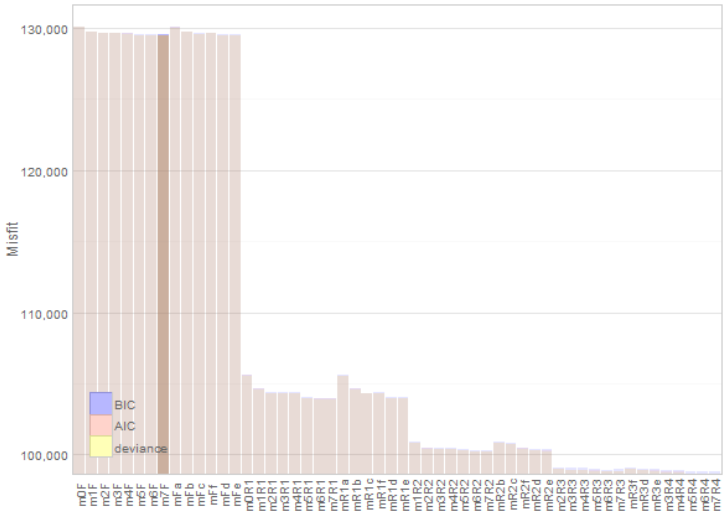
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.84	0.06	47.18		0.00				1.94
timec	-0.08	0.05	-1.57		0.00				1.94
timec2	0.01	0.01	1.04		0.00				1.94
timec3	-0.00	0.00	-0.75		0.00				1.94
cohort	0.25	0.02	10.51		0.00				1.94
timec:cohort	-0.08	0.02	-4.02		0.00				1.94
timec2:cohort	0.01	0.00	1.77		0.00				1.94
timec3:cohort	-0.00	0.00	-1.00		0.00				1.94



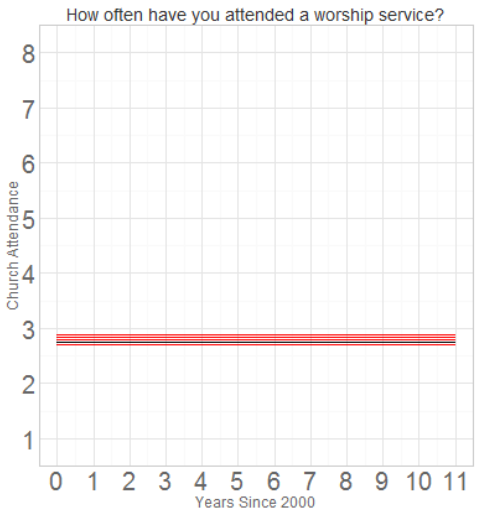


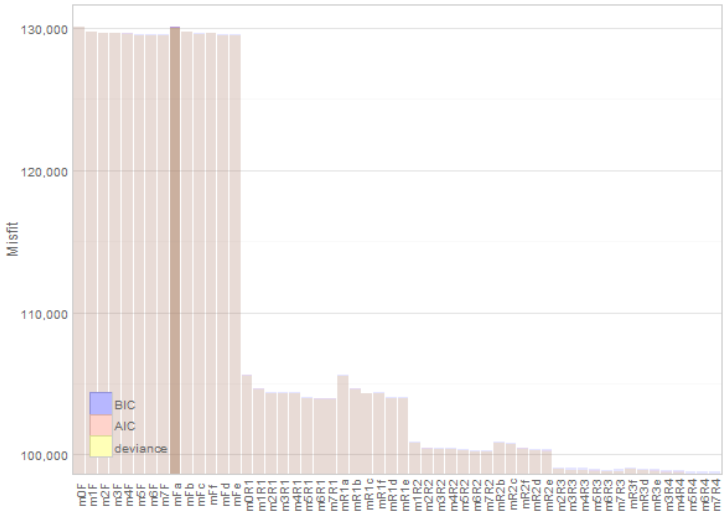
0.9 mFa –

$$y_{ti} = \beta_{0i} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_i$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.71	0.02	134.68		0.00				1.96
timec					0.00				1.96
timec2									
timec3									
cohort	0.04	0.01	5.44		0.00				1.96
timec:cohort									
timec2:cohort									
timec3:cohort									

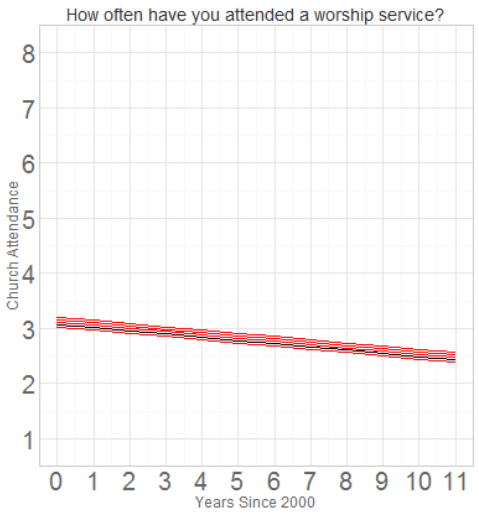


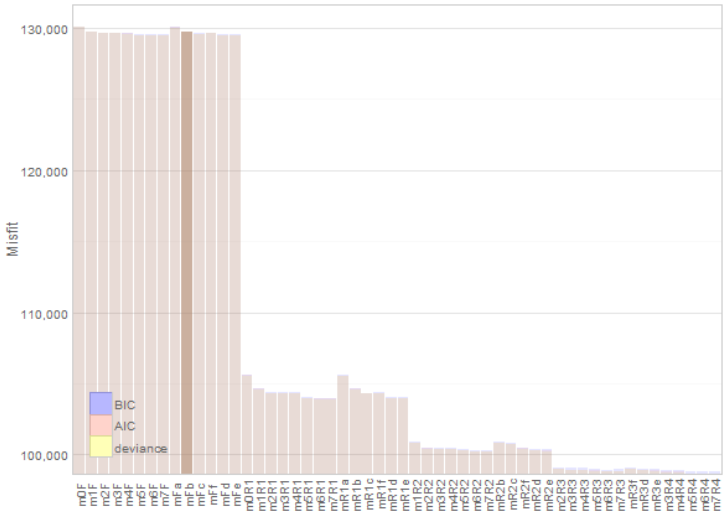


0.10 mFb

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$
$$\beta_{1i} = \gamma_{10}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.03	0.03	113.65		0.00				1.95
timec	-0.06	0.00	-18.25		0.00				1.95
timec2									
timec3									
cohort	0.04	0.01	5.47		0.00				1.95
timec:cohort									
timec2:cohort									
timec3:cohort									

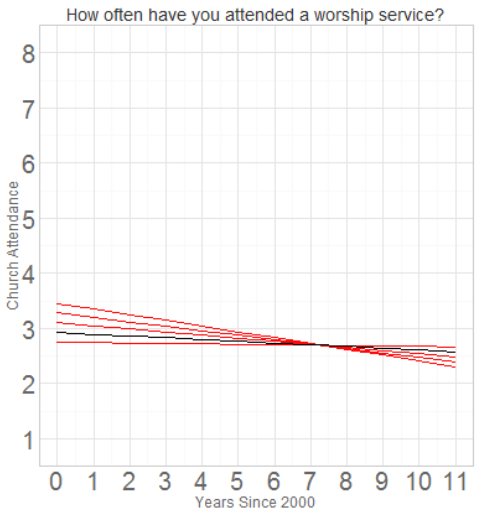


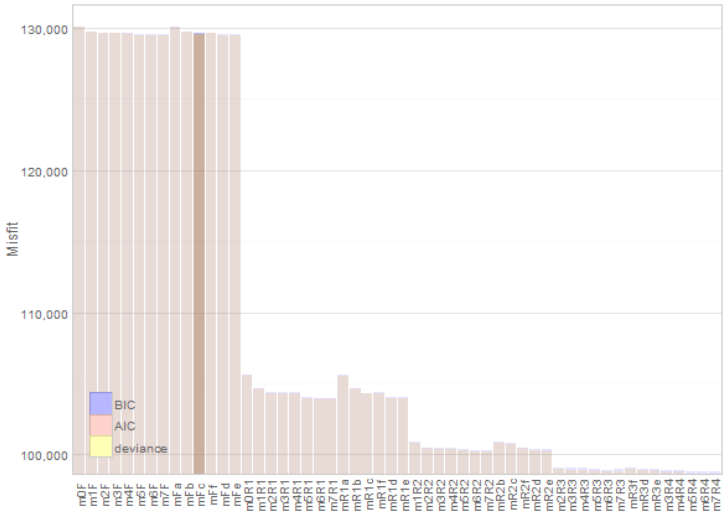


0.11 mFc

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.75	0.04	73.25		0.00				1.95
timec	-0.01	0.01	-1.35		0.00				1.95
timec2									
timec3									
cohort	0.18	0.01	11.82		0.00				1.95
timec:cohort	-0.02	0.00	-10.52		0.00				1.95
timec2:cohort									
timec3:cohort									





0.12 mFf

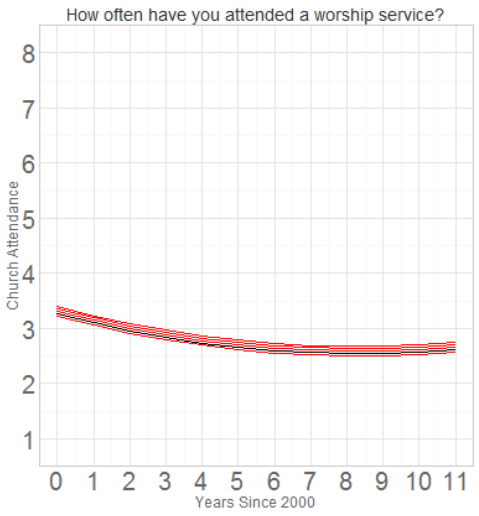
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

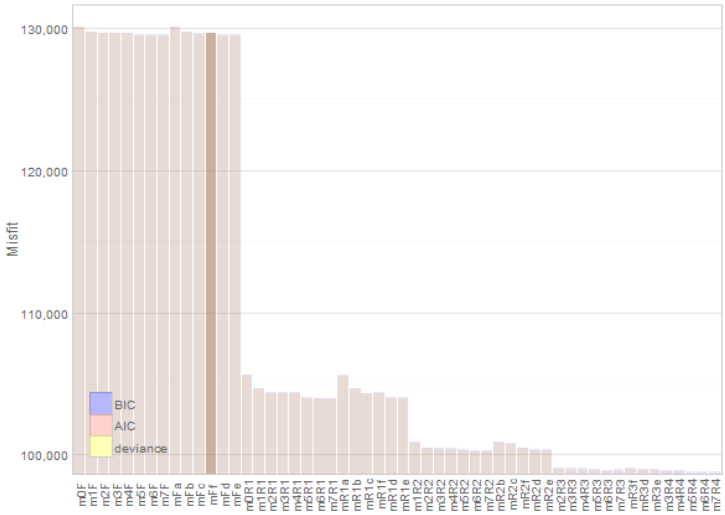
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.22	0.03	98.14		0.00				1.95
timec	-0.17	0.01	-14.49		0.00				1.95
timec2	0.01	0.00	9.96		0.00				1.95
timec3									
cohort	0.04	0.01	5.48		0.00				1.95
timec:cohort									
timec2:cohort									
timec3:cohort									





0.13 mFd

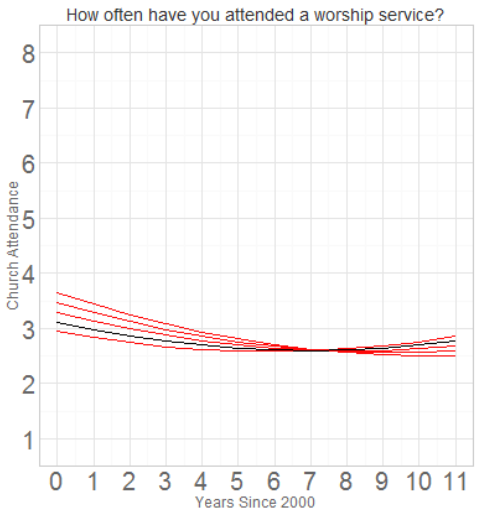
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

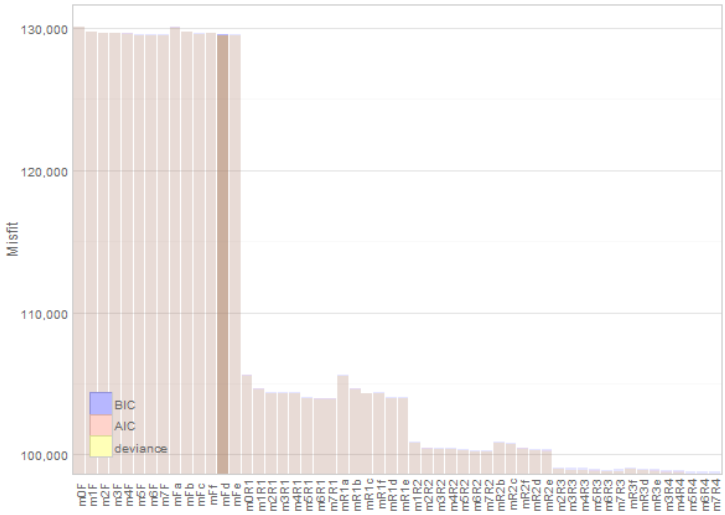
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.94	0.04	69.87		0.00				1.95
timec	-0.12	0.01	-9.53		0.00				1.95
timec2	0.01	0.00	9.98		0.00				1.95
timec3									
cohort	0.18	0.01	11.84		0.00				1.95
timec:cohort	-0.02	0.00	-10.54		0.00				1.95
timec2:cohort									
timec3:cohort									





0.14 mFe

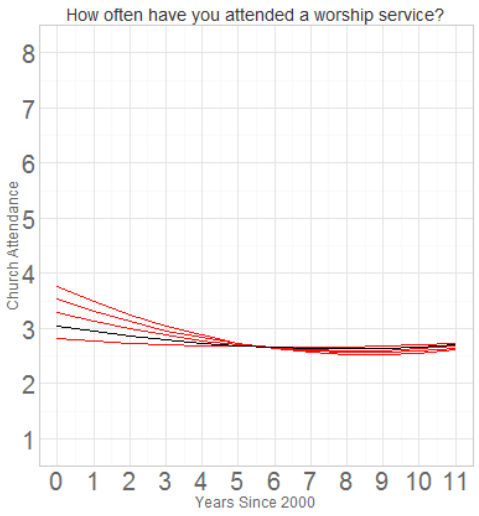
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

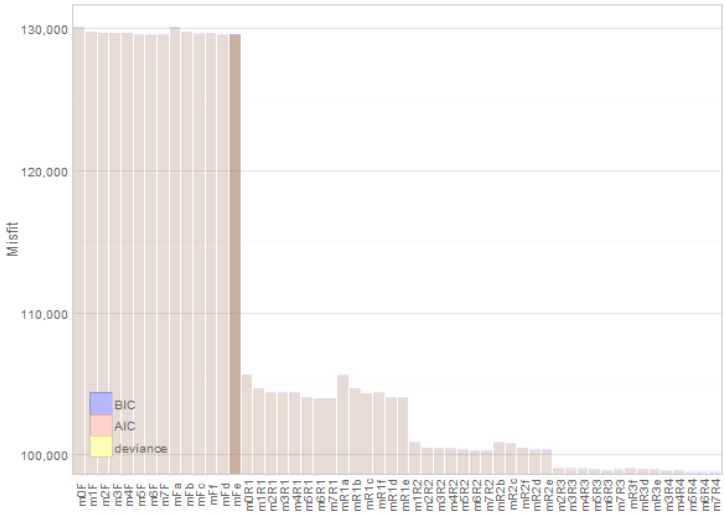
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.81	0.05	55.10		0.00				1.94
timec	-0.04	0.02	-2.06		0.00				1.94
timec2	0.00	0.00	1.77		0.00				1.94
timec3									
cohort	0.24	0.02	11.76		0.00				1.94
timec:cohort	-0.06	0.01	-7.17		0.00				1.94
timec2:cohort	0.00	0.00	4.51		0.00				1.94
timec3:cohort									





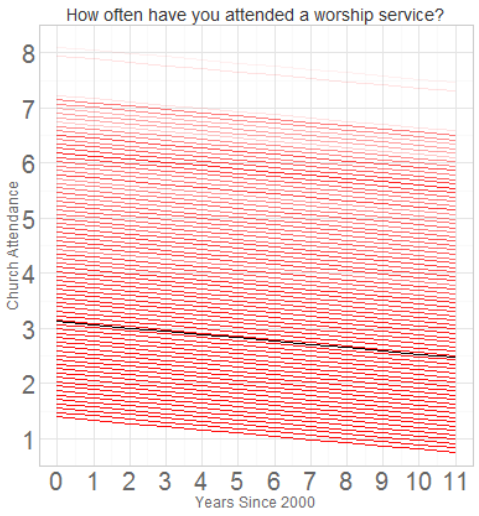
0.15 m1R1 – 1 Random

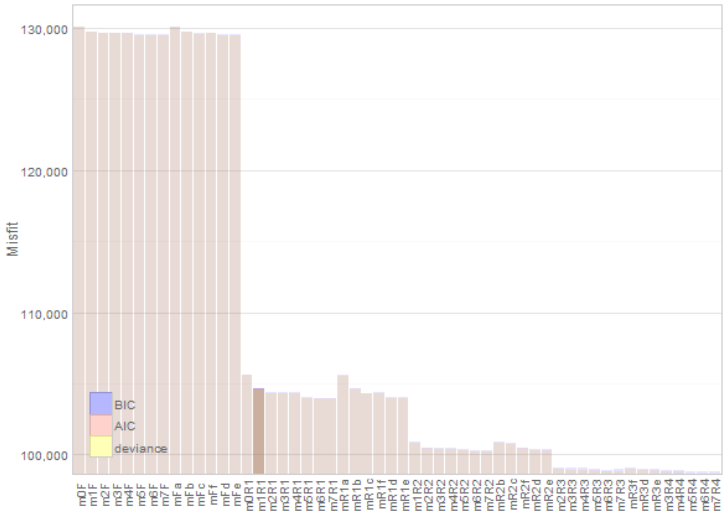
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.12	0.03	93.40	1.58	2.51				1.14
timec	-0.06	0.00	-31.22						1.14
timec2									
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.16 m2R1

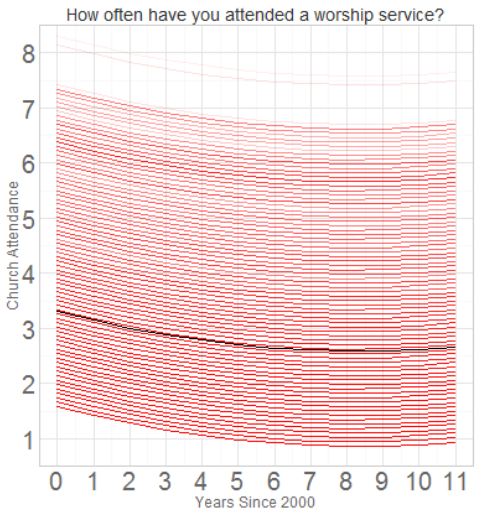
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

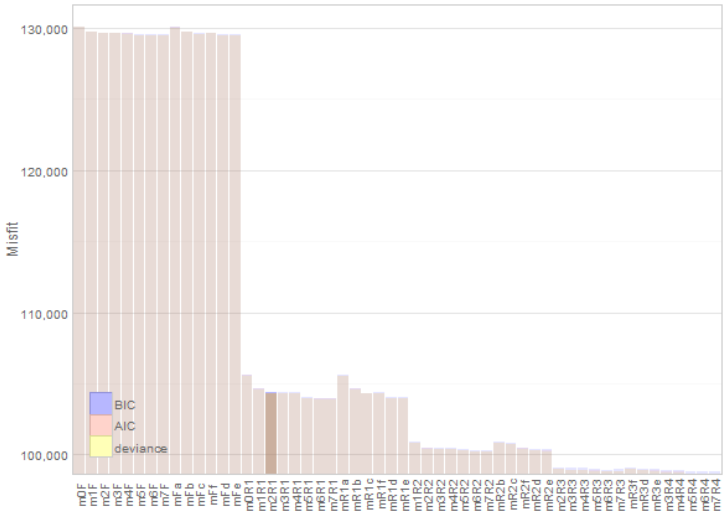
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.32	0.04	94.05	1.59	2.51				1.13
timec	-0.17	0.01	-24.88						1.13
timec2	0.01	0.00	17.11						1.13
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.17 m3R1

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

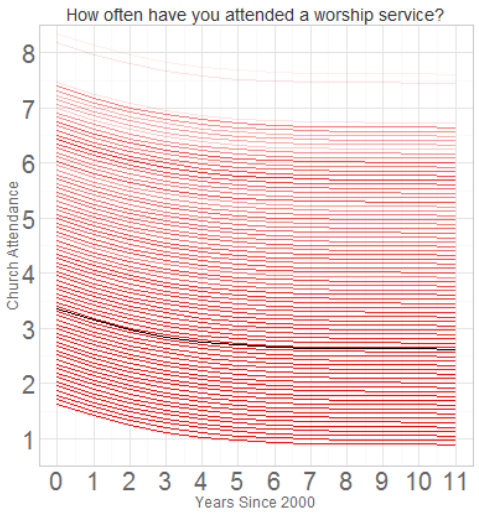
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

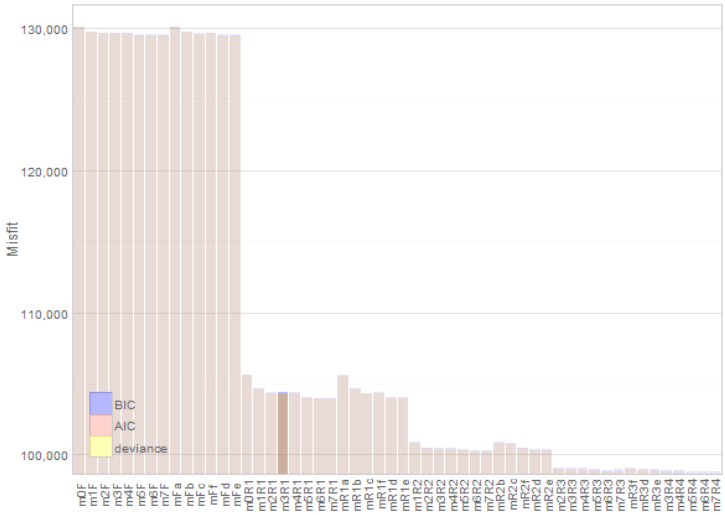
$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.37	0.04	91.67	1.59	2.51				1.13
timec	-0.24	0.02	-15.24						1.13
timec2	0.03	0.00	7.82						1.13
timec3	-0.00	0.00	-4.88						1.13
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.18 m4R1

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

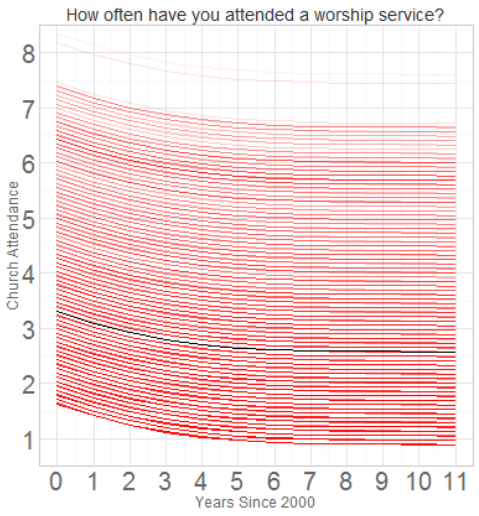
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

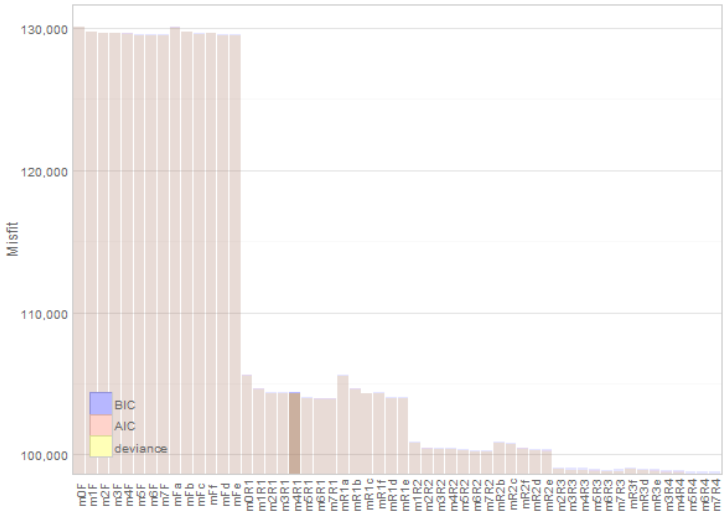
$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.27	0.06	54.28	1.58	2.51				1.13
timec	-0.24	0.02	-15.24						1.13
timec2	0.03	0.00	7.82						1.13
timec3	-0.00	0.00	-4.88						1.13
cohort	0.04	0.02	1.90						1.13
timec:cohort									
timec2:cohort									
timec3:cohort									





0.19 m5R1

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

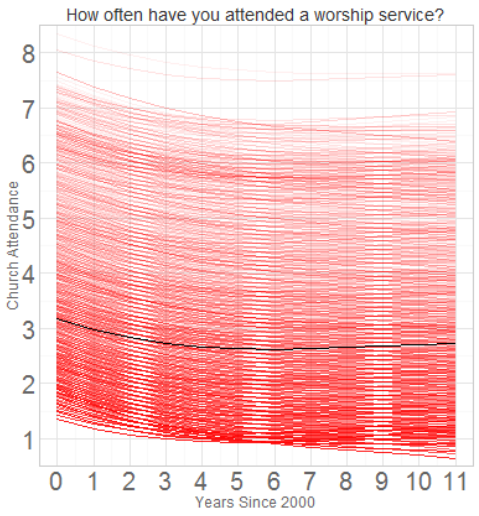
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

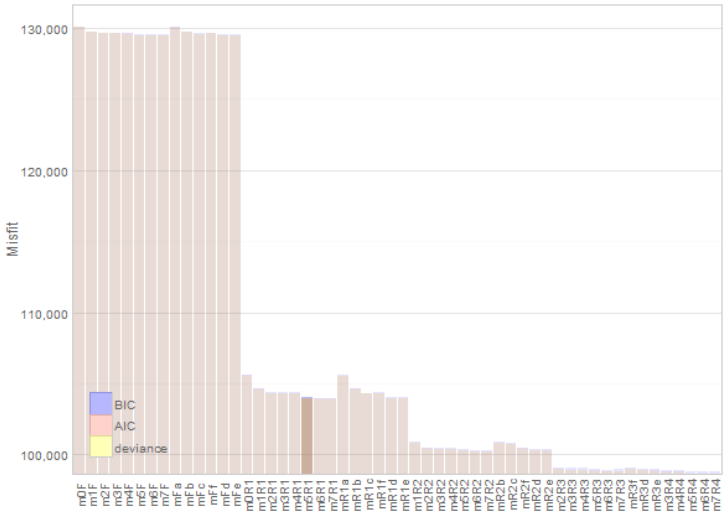
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.00	0.06	48.14	1.58	2.51				1.13
timec	-0.19	0.02	-11.96						1.13
timec2	0.03	0.00	7.86						1.13
timec3	-0.00	0.00	-4.91						1.13
cohort	0.18	0.02	7.36						1.13
timec:cohort	-0.02	0.00	-18.17						1.13
timec2:cohort									
timec3:cohort									





0.20 m6R1

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

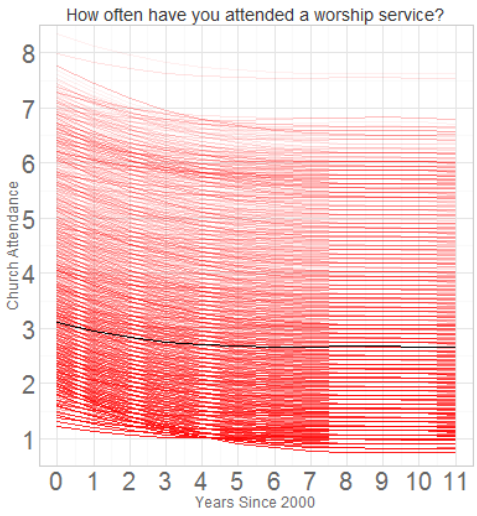
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

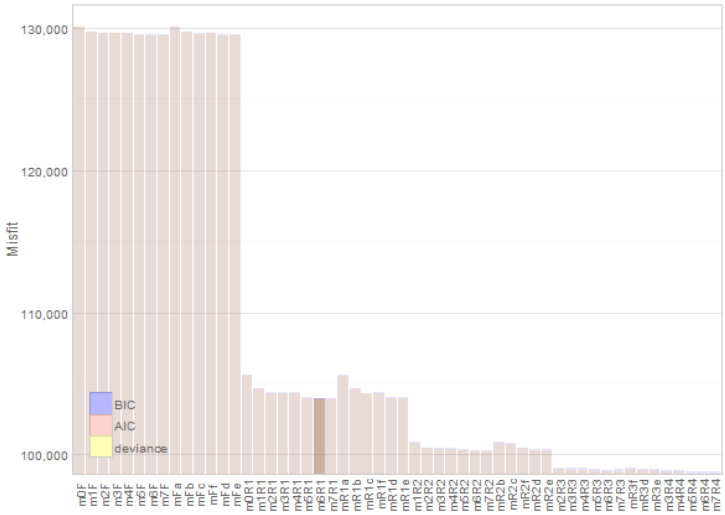
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.86	0.06	44.47	1.58	2.51				1.13
timec	-0.11	0.02	-6.05						1.13
timec2	0.02	0.00	5.62						1.13
timec3	-0.00	0.00	-4.92						1.13
cohort	0.24	0.03	9.45						1.13
timec:cohort	-0.06	0.00	-12.37						1.13
timec2:cohort	0.00	0.00	7.79						1.13
timec3:cohort									





0.21 m7R1

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

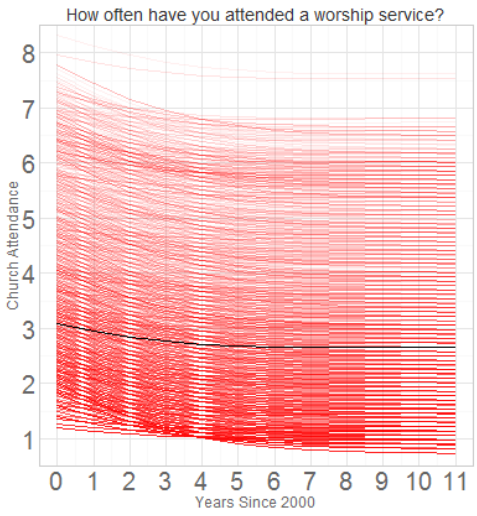
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

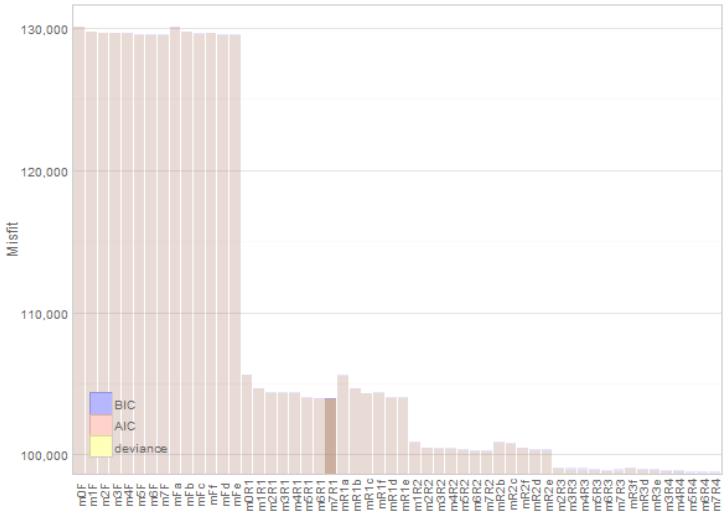
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.84	0.07	42.87	1.58	2.51				1.13
timec	-0.08	0.03	-2.71						1.13
timec2	0.01	0.01	1.80						1.13
timec3	-0.00	0.00	-1.29						1.13
cohort	0.25	0.03	9.55						1.13
timec:cohort	-0.08	0.01	-6.94						1.13
timec2:cohort	0.01	0.00	3.06						1.13
timec3:cohort	-0.00	0.00	-1.72						1.13



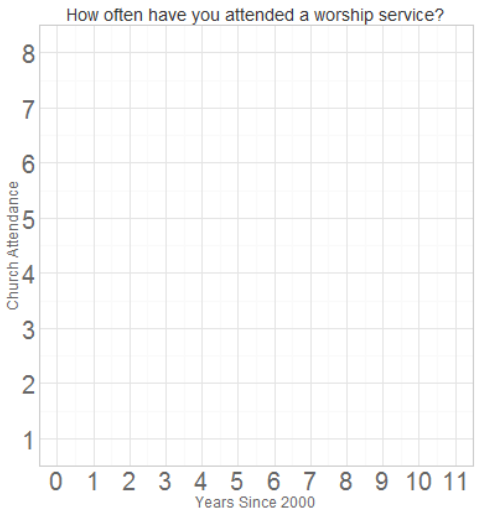


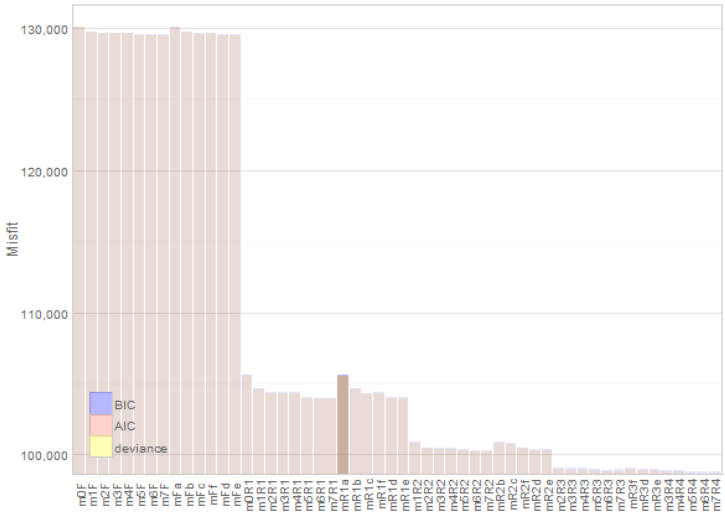
0.22 mR1a –

$$y_{ti} = \beta_{0i} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_i + u_{0i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.71	0.06	47.16	1.58	2.50				1.16
timec									
timec2									
timec3									
cohort	0.04	0.02	1.90						1.16
timec:cohort									
timec2:cohort									
timec3:cohort									

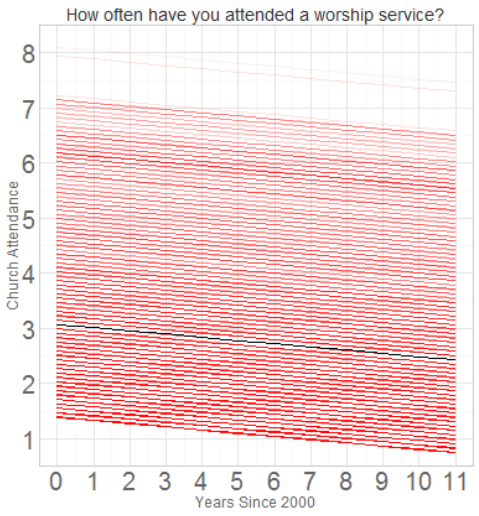


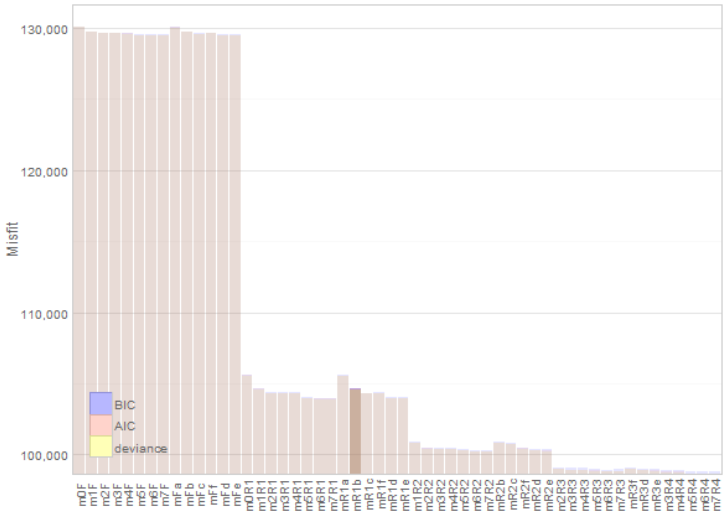


0.23 mR1b

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$
$$\beta_{1i} = \gamma_{10}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.03	0.06	51.94	1.58	2.51				1.14
timec	-0.06	0.00	-31.22						1.14
timec2									
timec3									
cohort	0.04	0.02	1.90						1.14
timec:cohort									
timec2:cohort									
timec3:cohort									

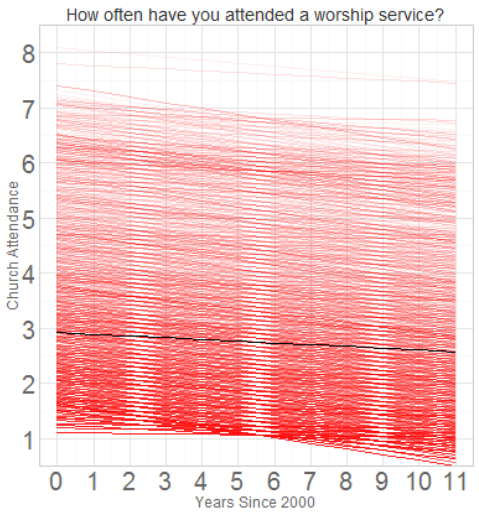


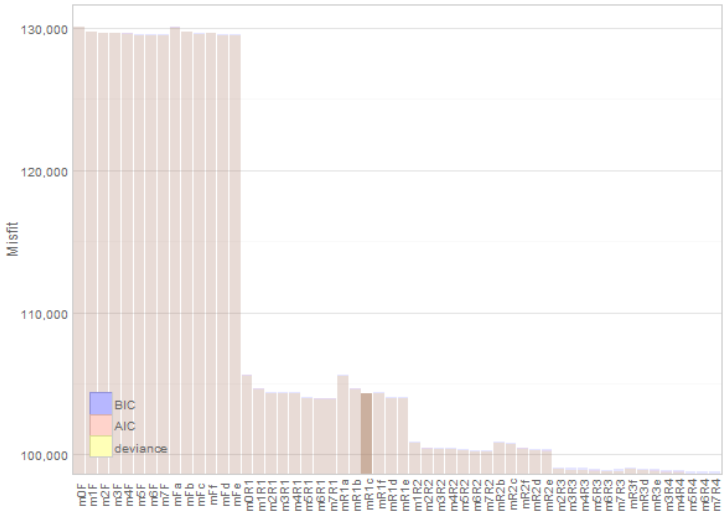


0.24 mR1c

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.75	0.06	45.60	1.58	2.51				1.13
timec	-0.01	0.00	-2.32						1.13
timec2									
timec3									
cohort	0.18	0.02	7.36						1.13
timec:cohort	-0.02	0.00	-18.07						1.13
timec2:cohort									
timec3:cohort									





0.25 mR1f

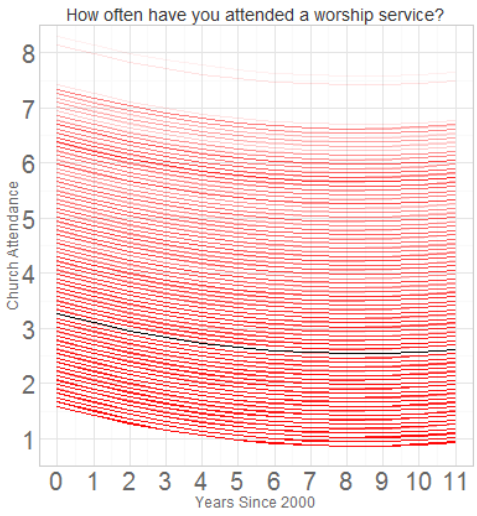
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

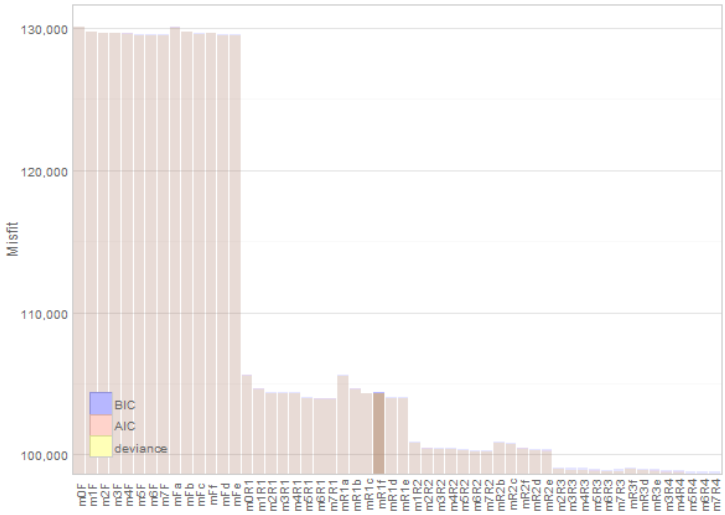
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.22	0.06	54.24	1.58	2.51				1.13
timec	-0.17	0.01	-24.88						1.13
timec2	0.01	0.00	17.11						1.13
timec3									
cohort	0.04	0.02	1.90						1.13
timec:cohort									
timec2:cohort									
timec3:cohort									





0.26 mR1d

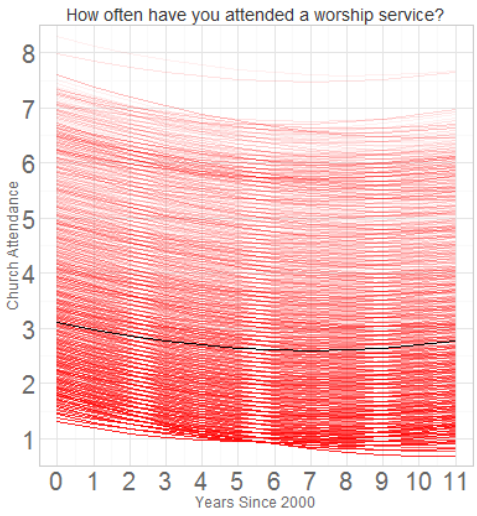
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

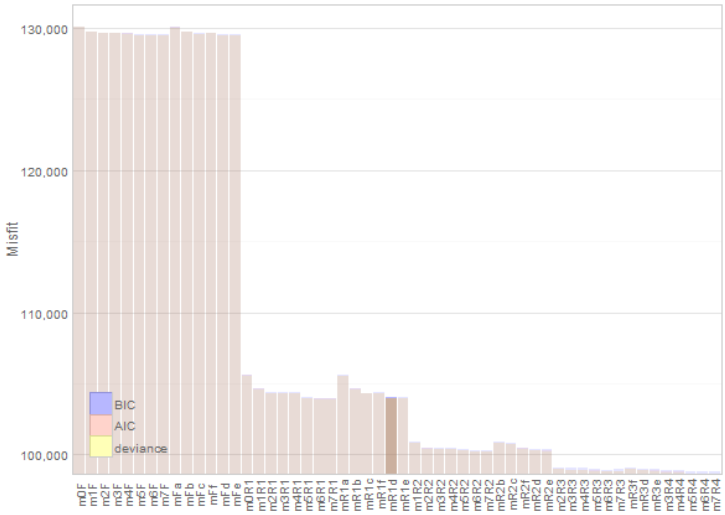
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.94	0.06	47.98	1.58	2.51				1.13
timec	-0.12	0.01	-16.42						1.13
timec2	0.01	0.00	17.21						1.13
timec3									
cohort	0.18	0.02	7.36						1.13
timec:cohort	-0.02	0.00	-18.17						1.13
timec2:cohort									
timec3:cohort									





0.27 mR1e

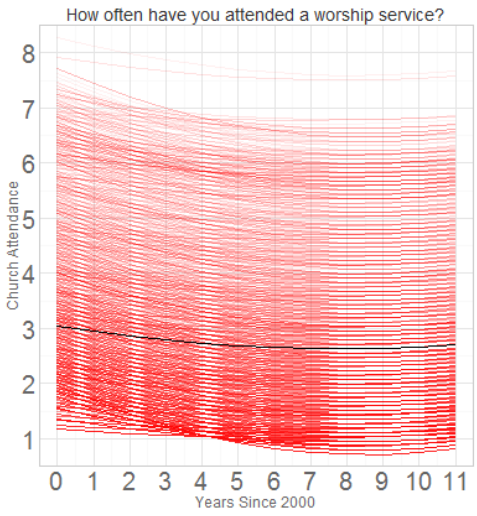
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

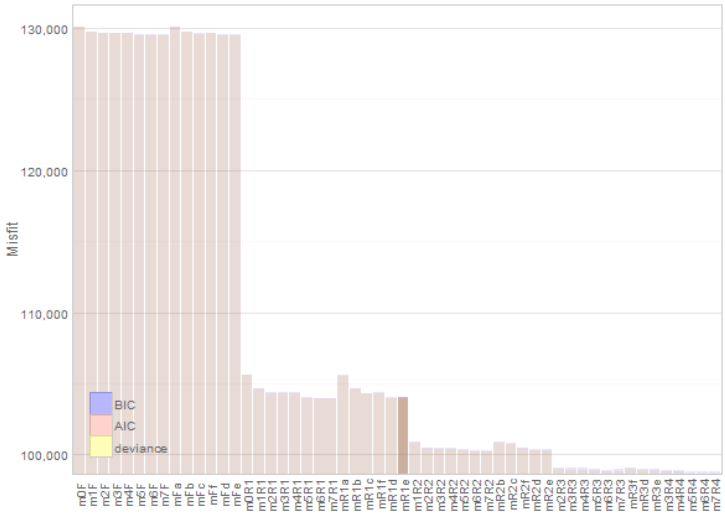
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.81	0.06	44.25	1.58	2.51				1.13
timec	-0.04	0.01	-3.56						1.13
timec2	0.00	0.00	3.05						1.13
timec3									
cohort	0.24	0.03	9.44						1.13
timec:cohort	-0.06	0.00	-12.37						1.13
timec2:cohort	0.00	0.00	7.78						1.13
timec3:cohort									





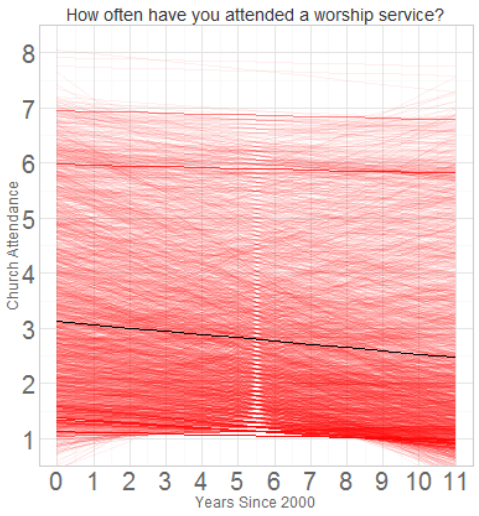
0.28 m1R2 – 2 Random

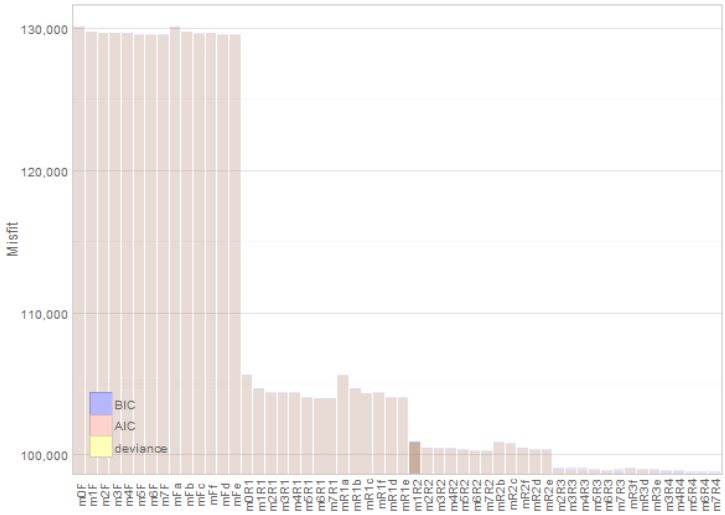
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.12	0.04	83.91	1.82	3.29	-0.13			1.00
timec	-0.06	0.00	-17.06	0.15	-0.13	0.02			1.00
timec2									
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.29 m2R2

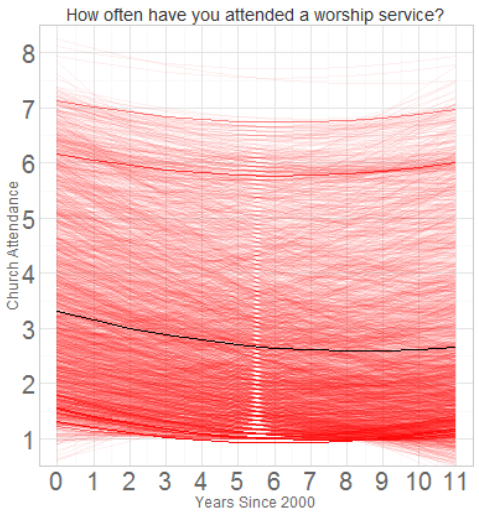
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

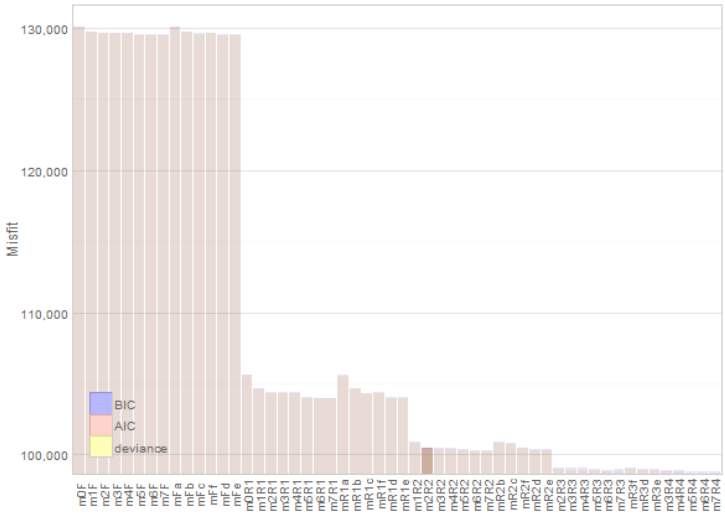
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.32	0.04	86.13	1.82	3.30	-0.13			0.99
timec	-0.17	0.01	-25.54	0.15	-0.13	0.02			0.99
timec2	0.01	0.00	19.61						0.99
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.30 m3R2

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

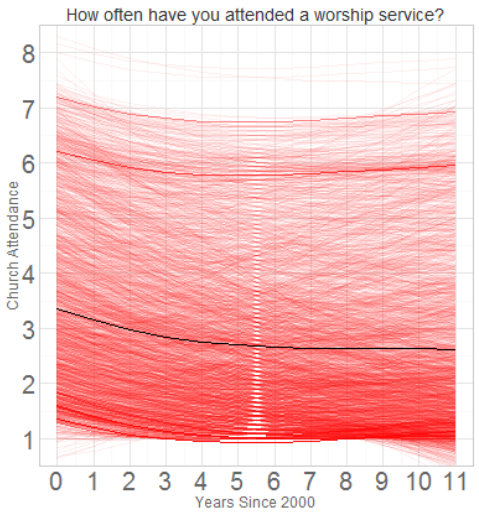
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

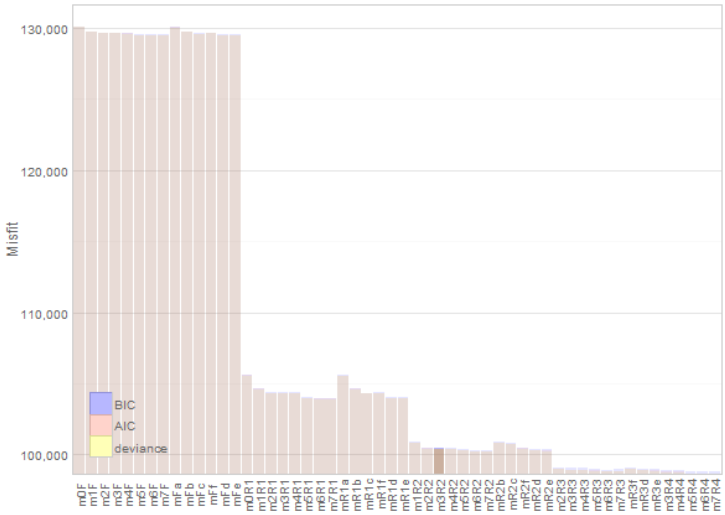
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.37	0.04	85.17	1.82	3.30	-0.13			0.99
timec	-0.24	0.01	-17.07	0.15	-0.13	0.02			0.99
timec2	0.03	0.00	8.96						0.99
timec3	-0.00	0.00	-5.60						0.99
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.31 m4R2

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

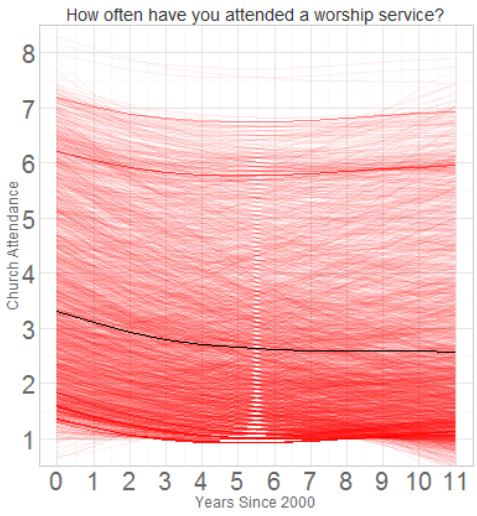
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

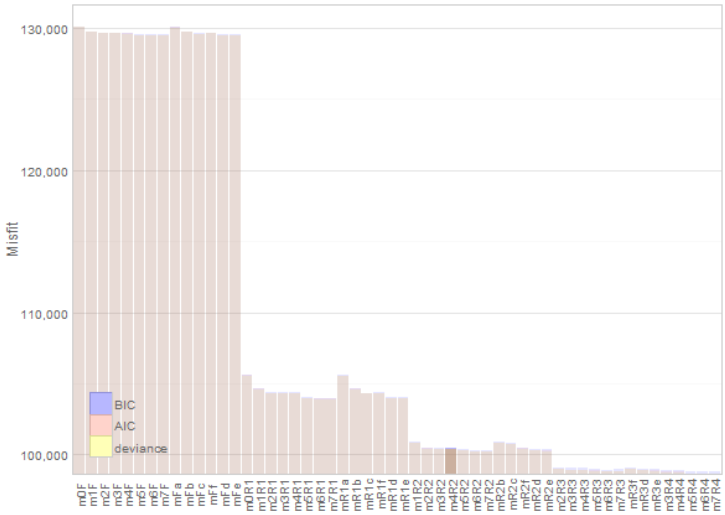
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.28	0.06	52.87	1.81	3.27	-0.13			0.99
timec	-0.24	0.01	-17.07	0.15	-0.13	0.02			0.99
timec2	0.03	0.00	8.96						0.99
timec3	-0.00	0.00	-5.60						0.99
cohort	0.04	0.02	1.83						0.99
timec:cohort									
timec2:cohort									
timec3:cohort									





0.32 m5R2

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

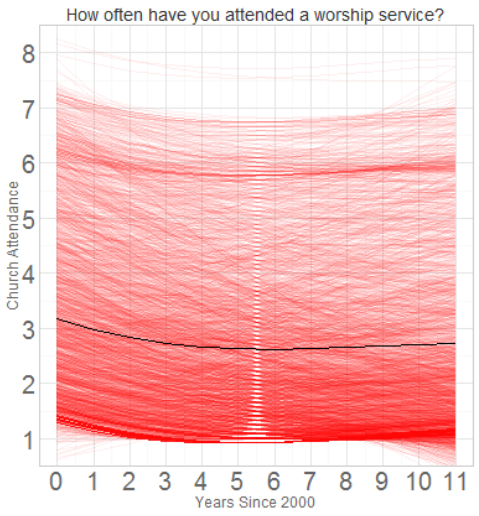
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

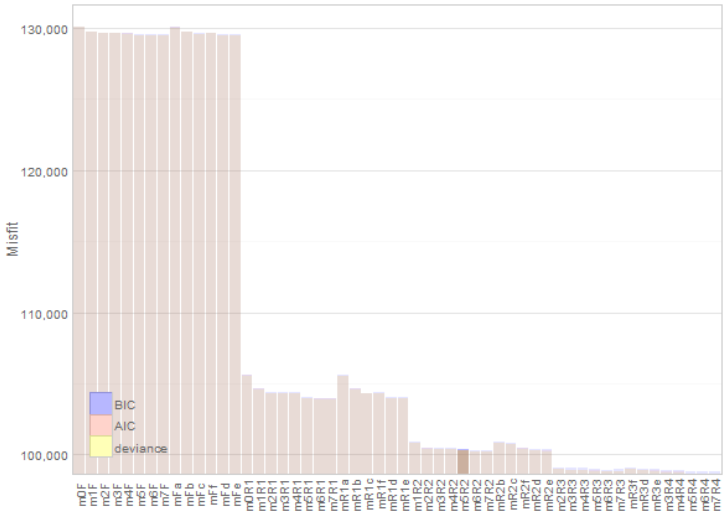
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.00	0.07	44.02	1.80	3.24	-0.13			0.99
timec	-0.19	0.02	-12.75	0.15	-0.13	0.02			0.99
timec2	0.03	0.00	8.96						0.99
timec3	-0.00	0.00	-5.60						0.99
cohort	0.18	0.03	6.66						0.99
timec:cohort	-0.02	0.00	-10.01						0.99
timec2:cohort									
timec3:cohort									





0.33 m6R2

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

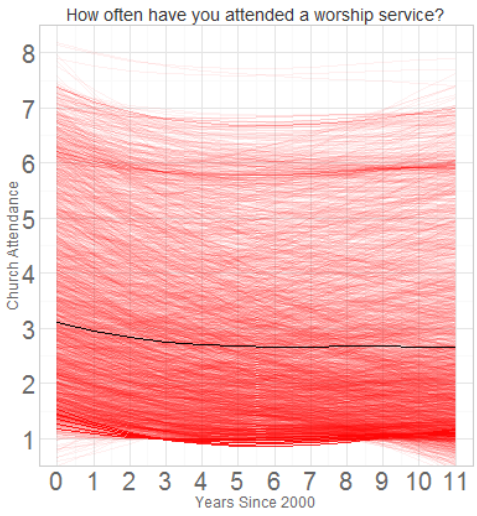
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

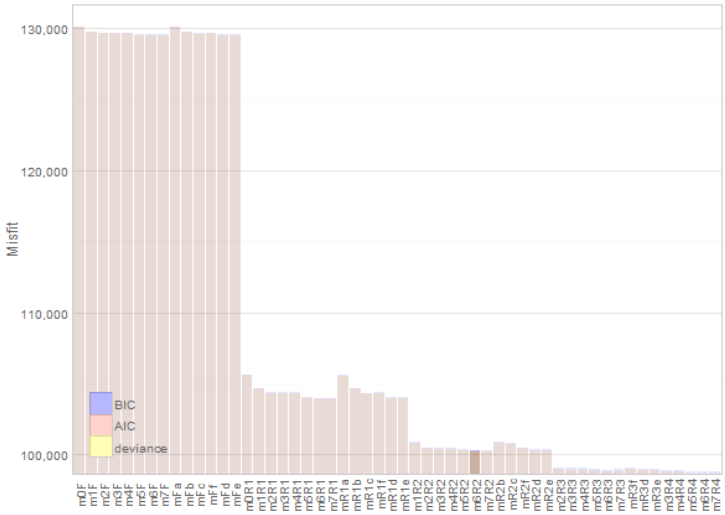
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.86	0.07	41.16	1.80	3.24	-0.13			0.99
timec	-0.11	0.02	-6.56	0.15	-0.13	0.02			0.99
timec2	0.02	0.00	6.40						0.99
timec3	-0.00	0.00	-5.61						0.99
cohort	0.24	0.03	8.70						0.99
timec:cohort	-0.06	0.00	-12.68						0.99
timec2:cohort	0.00	0.00	8.88						0.99
timec3:cohort									





0.34 m7R2

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

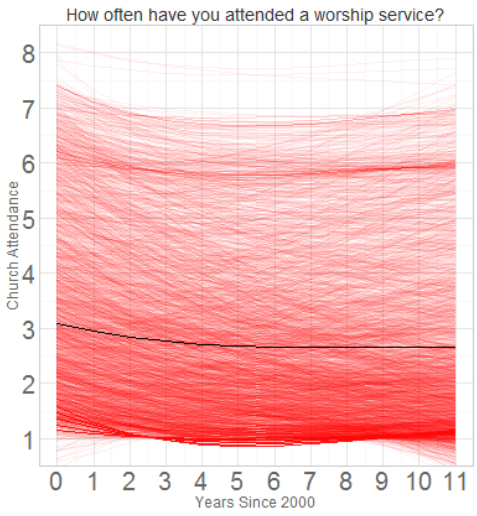
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

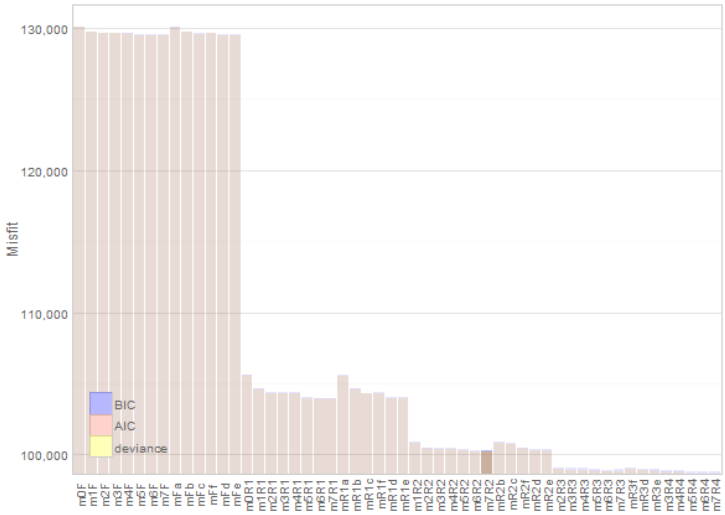
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.84	0.07	40.04	1.80	3.24	-0.13			0.99
timec	-0.08	0.03	-3.02	0.15	-0.13	0.02			0.99
timec2	0.01	0.01	2.05						0.99
timec3	-0.00	0.00	-1.47						0.99
cohort	0.25	0.03	8.92						0.99
timec:cohort	-0.08	0.01	-7.74						0.99
timec2:cohort	0.01	0.00	3.49						0.99
timec3:cohort	-0.00	0.00	-1.96						0.99

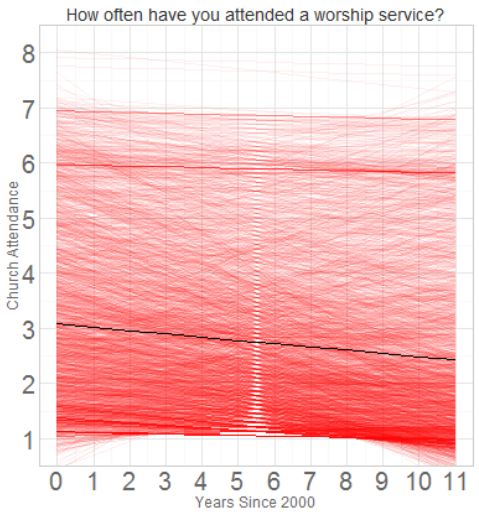


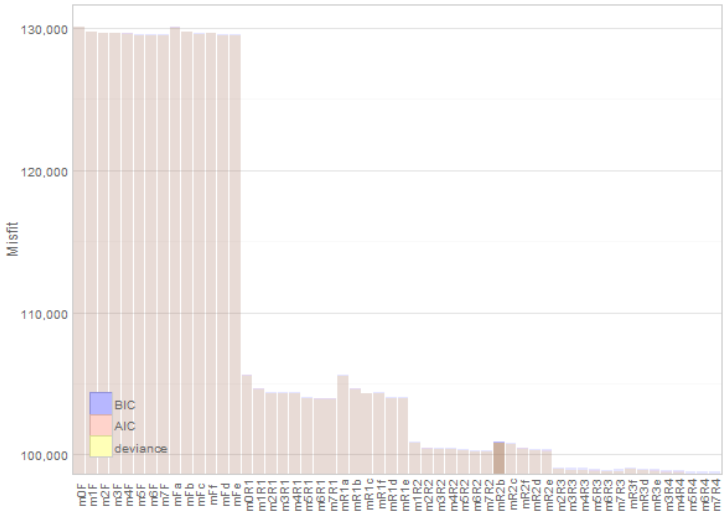


0.35 mR2b –

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.04	0.06	50.13	1.81	3.27	-0.13			1.00
timec	-0.06	0.00	-17.06	0.15	-0.13	0.02			1.00
timec2									
timec3									
cohort	0.04	0.02	1.83						1.00
timec:cohort									
timec2:cohort									
timec3:cohort									

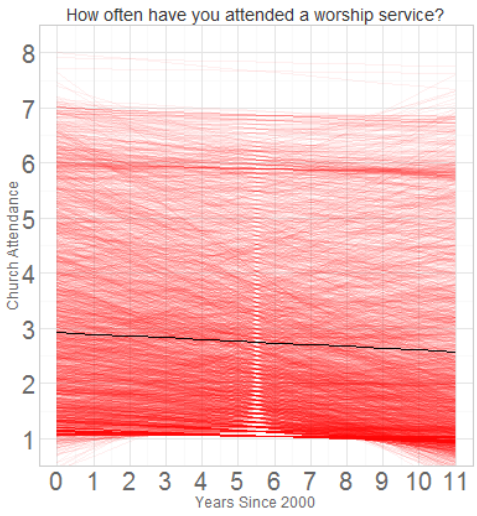


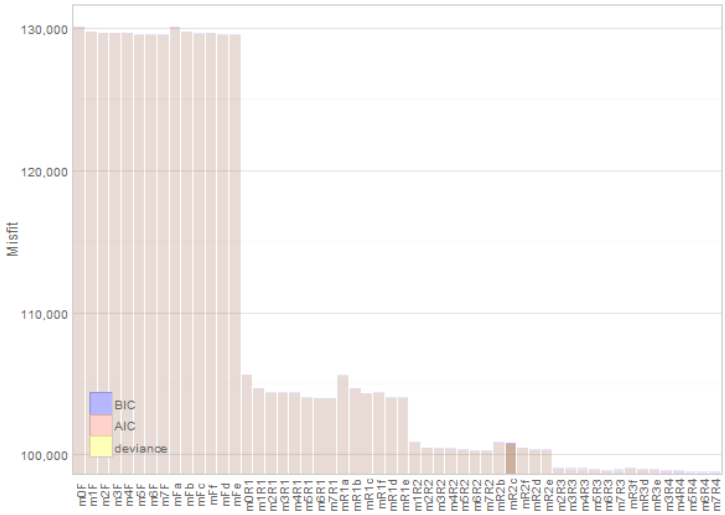


0.36 mR2c

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \varepsilon_{ti}$$
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.75	0.07	41.26	1.80	3.23	-0.13			1.00
timec	-0.01	0.01	-1.28	0.15	-0.13	0.02			1.00
timec2									
timec3									
cohort	0.18	0.03	6.66						1.00
timec:cohort	-0.02	0.00	-10.01						1.00
timec2:cohort									
timec3:cohort									





0.37 mR2f

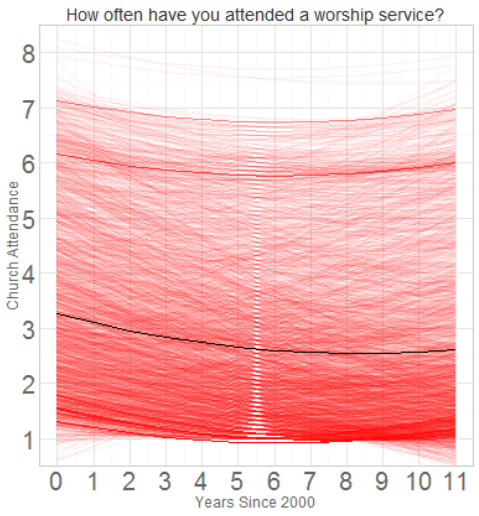
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

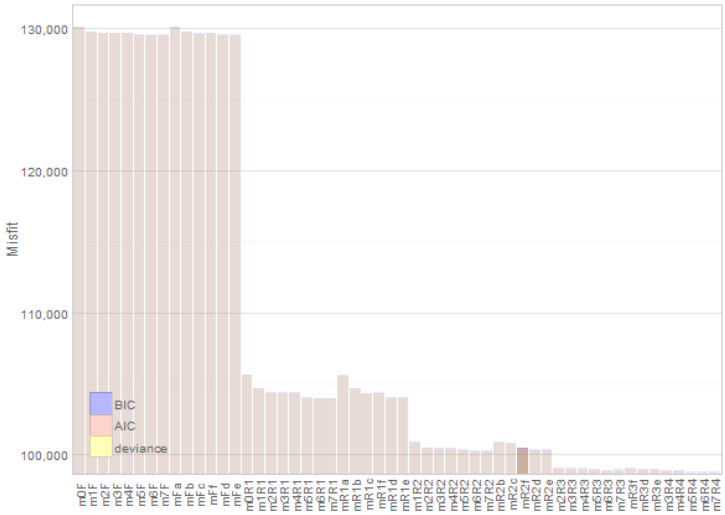
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.23	0.06	52.61	1.81	3.27	-0.13			0.99
timec	-0.17	0.01	-25.54	0.15	-0.13	0.02			0.99
timec2	0.01	0.00	19.61						0.99
timec3									
cohort	0.04	0.02	1.83						0.99
timec:cohort									
timec2:cohort									
timec3:cohort									





0.38 mR2d

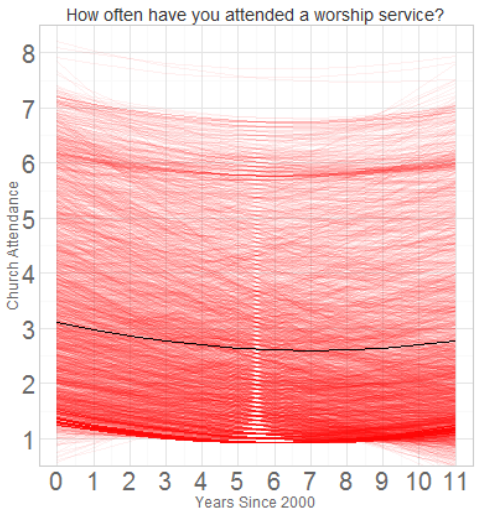
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

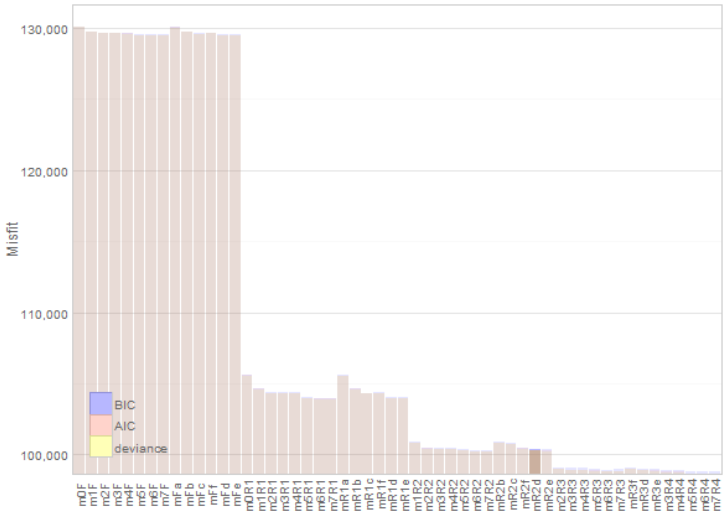
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.94	0.07	43.67	1.80	3.24	-0.13			0.99
timec	-0.12	0.01	-14.52	0.15	-0.13	0.02			0.99
timec2	0.01	0.00	19.61						0.99
timec3									
cohort	0.18	0.03	6.66						0.99
timec:cohort	-0.02	0.00	-10.01						0.99
timec2:cohort									
timec3:cohort									





0.39 mR2e

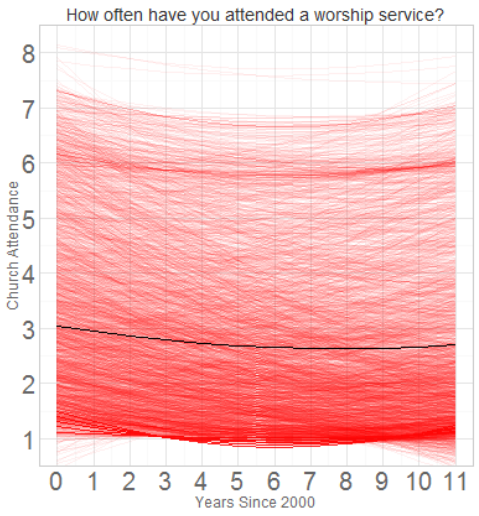
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

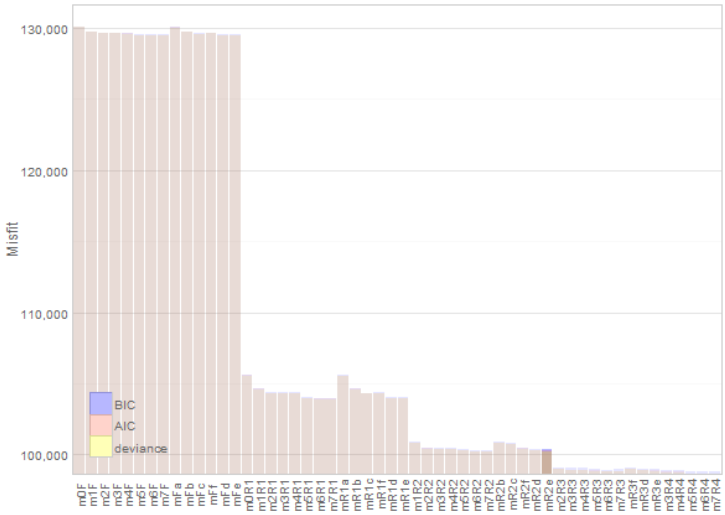
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.81	0.07	40.78	1.80	3.24	-0.13			0.99
timec	-0.04	0.01	-3.65	0.15	-0.13	0.02			0.99
timec2	0.00	0.00	3.47						0.99
timec3									
cohort	0.24	0.03	8.70						0.99
timec:cohort	-0.06	0.00	-12.68						0.99
timec2:cohort	0.00	0.00	8.87						0.99
timec3:cohort									





0.40 m2R3 – 3 Random

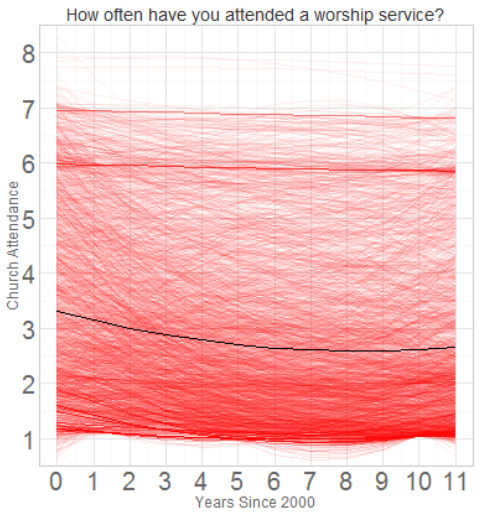
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

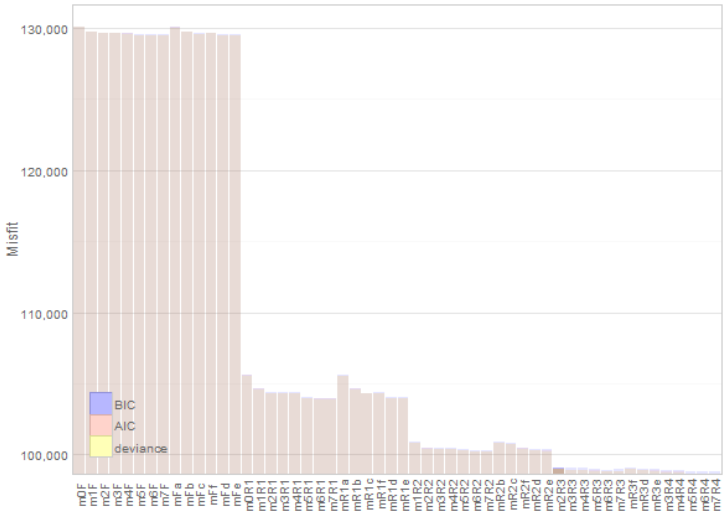
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.32	0.04	82.10	1.94	3.76	-0.39	0.02		0.92
timec	-0.17	0.01	-17.36	0.42	-0.39	0.18	-0.01		0.92
timec2	0.01	0.00	13.12	0.03	0.02	-0.01	0.00		0.92
timec3									
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.41 m3R3

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

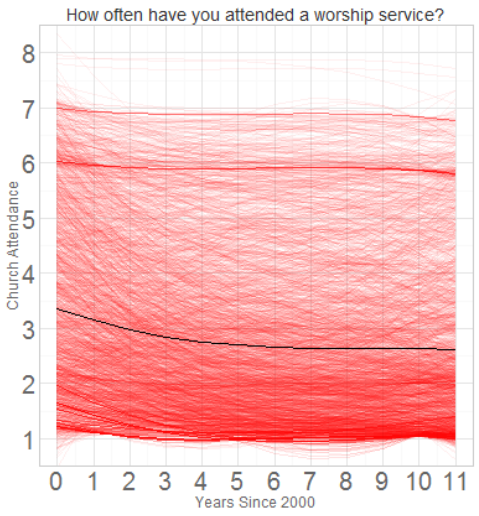
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

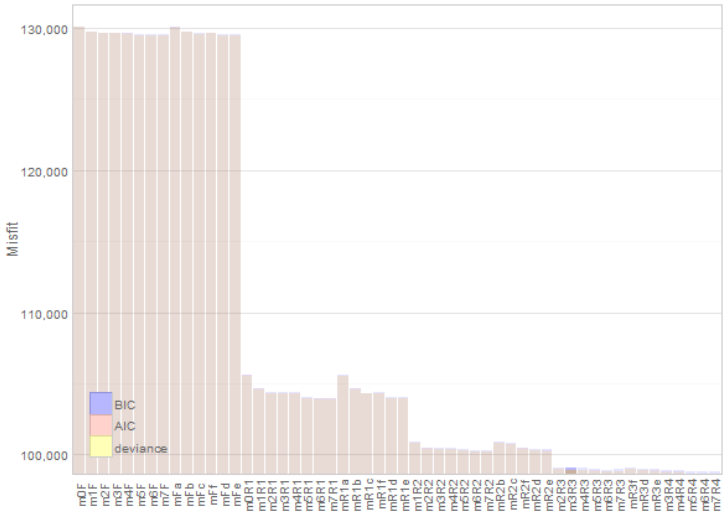
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.37	0.04	81.64	1.94	3.76	-0.39	0.02		0.92
timec	-0.24	0.02	-15.87	0.42	-0.39	0.18	-0.01		0.92
timec2	0.03	0.00	9.42	0.03	0.02	-0.01	0.00		0.92
timec3	-0.00	0.00	-6.03						0.92
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.42 m4R3

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

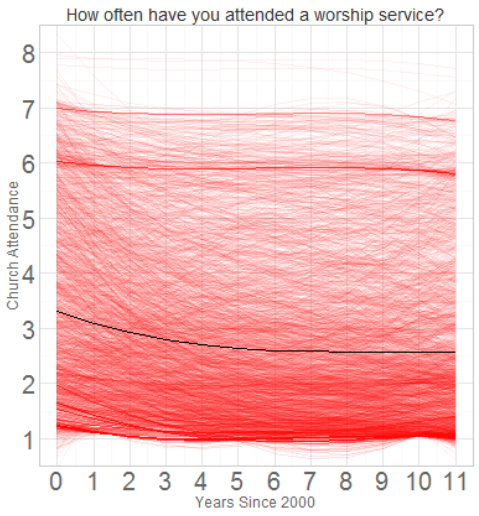
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

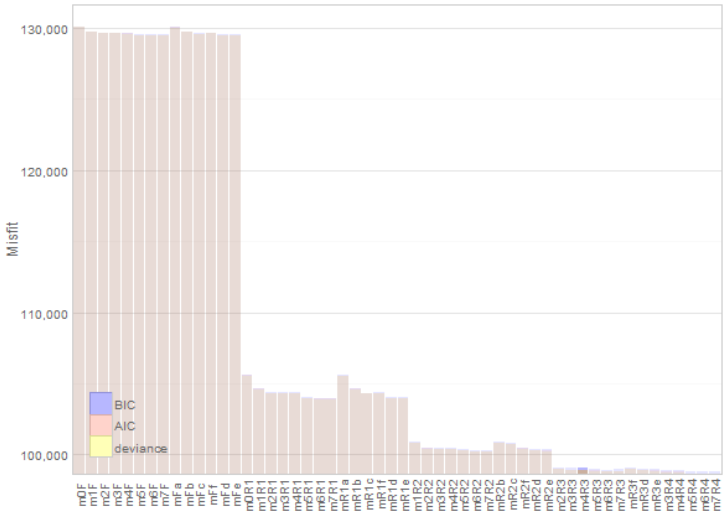
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.26	0.06	51.82	1.93	3.72	-0.39	0.02		0.92
timec	-0.24	0.02	-15.87	0.42	-0.39	0.18	-0.01		0.92
timec2	0.03	0.00	9.42	0.03	0.02	-0.01	0.00		0.92
timec3	-0.00	0.00	-6.03						0.92
cohort	0.05	0.02	2.21						0.92
timec:cohort									
timec2:cohort									
timec3:cohort									





0.43 m5R3

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

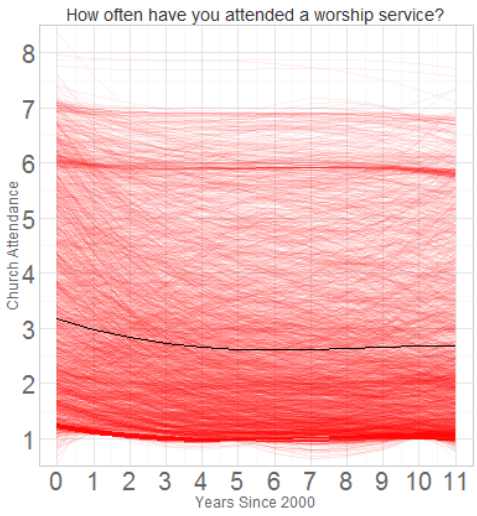
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

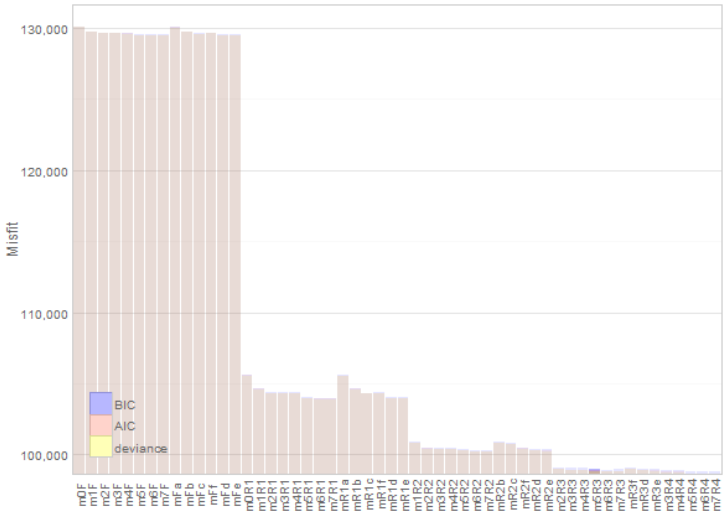
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.00	0.07	43.53	1.91	3.66	-0.37	0.02		0.92
timec	-0.20	0.02	-12.31	0.41	-0.37	0.17	-0.01		0.92
timec2	0.03	0.00	9.42	0.03	0.02	-0.01	0.00		0.92
timec3	-0.00	0.00	-6.03						0.92
cohort	0.17	0.03	6.58						0.92
timec:cohort	-0.02	0.00	-9.12						0.92
timec2:cohort									
timec3:cohort									





0.44 m6R3

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

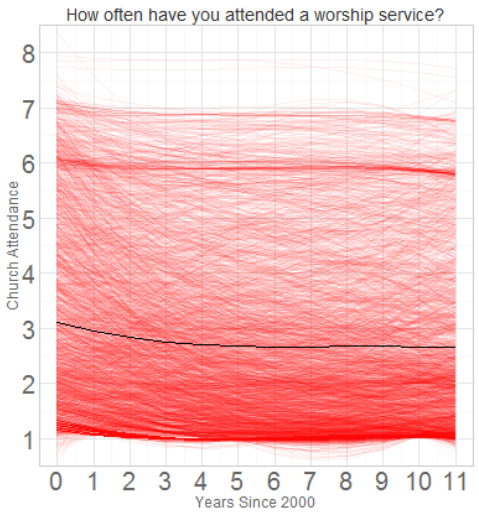
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

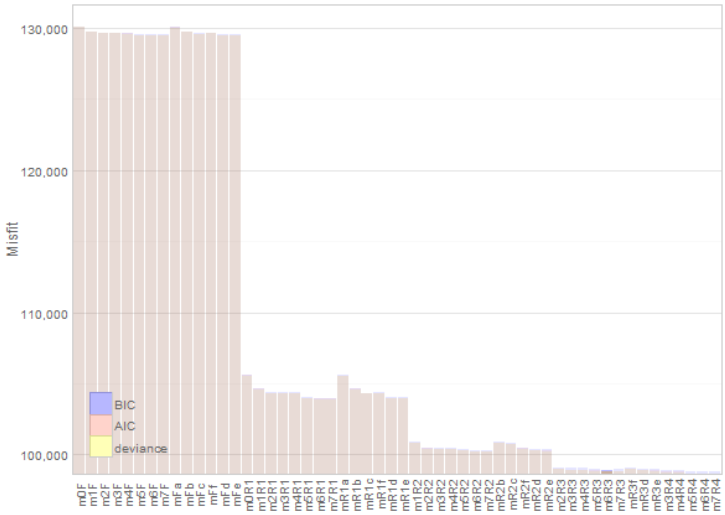
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i} + u_{2i}$$

$$\beta_{3i} = \gamma_{30}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.86	0.07	39.51	1.91	3.65	-0.36	0.02		0.92
timec	-0.11	0.02	-5.40	0.41	-0.36	0.17	-0.01		0.92
timec2	0.02	0.00	6.43	0.03	0.02	-0.01	0.00		0.92
timec3	-0.00	0.00	-6.03						0.92
cohort	0.24	0.03	8.34						0.92
timec:cohort	-0.06	0.01	-8.69						0.92
timec2:cohort	0.00	0.00	5.97						0.92
timec3:cohort									





0.45 m7R3

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

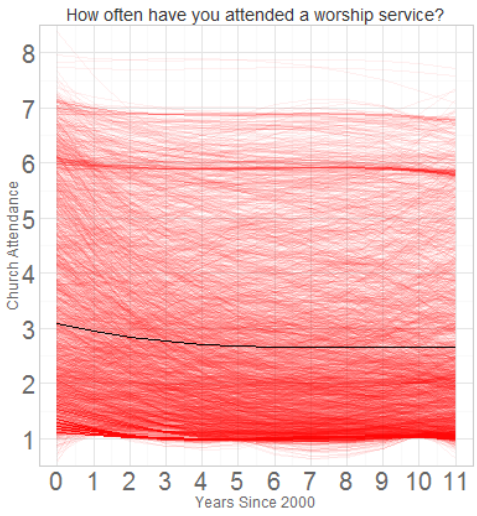
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

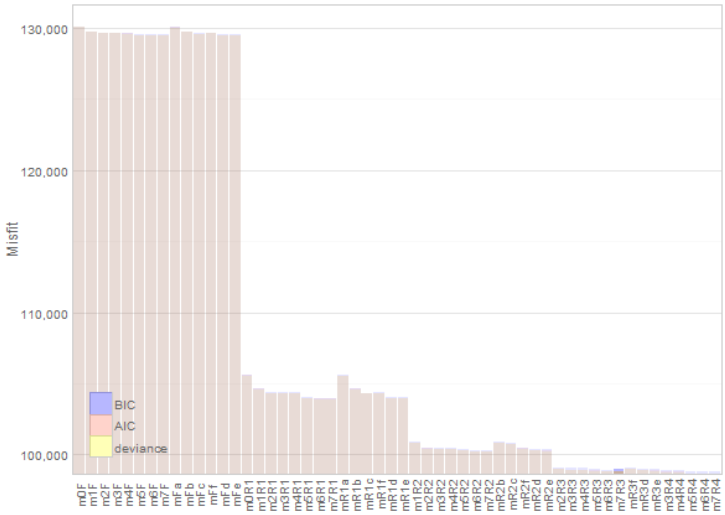
$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31} cohort_{i}$$

	Estimate	Std.Error	t.value
(Intercept)	2.84	0.07	38.57
timec	-0.08	0.03	-2.82
timec2	0.01	0.01	2.16
timec3	-0.00	0.00	-1.58
cohort	0.25	0.03	8.60
timec:cohort	-0.08	0.01	-7.22
timec2:cohort	0.01	0.00	3.67
timec3:cohort	-0.00	0.00	-2.11

sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
1.91	3.65	-0.36	0.02		0.92
0.41	-0.36	0.17	-0.01		0.92
0.03	0.02	-0.01	0.00		0.92
					0.92
					0.92
					0.92
					0.92
					0.92





0.46 mR3f –

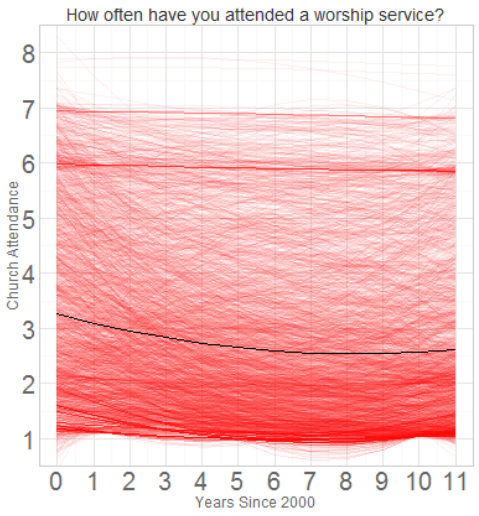
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

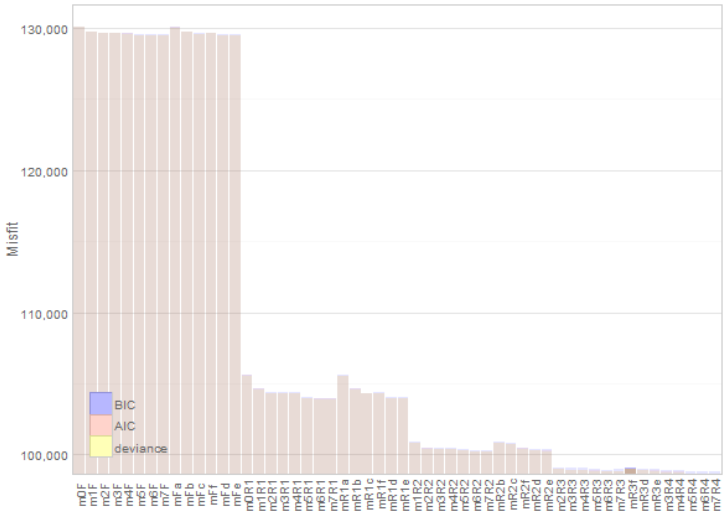
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.21	0.06	51.47	1.93	3.72	-0.39	0.02		0.92
timec	-0.17	0.01	-17.36	0.42	-0.39	0.18	-0.01		0.92
timec2	0.01	0.00	13.12	0.03	0.02	-0.01	0.00		0.92
timec3									
cohort	0.05	0.02	2.21						0.92
timec:cohort									
timec2:cohort									
timec3:cohort									





0.47 mR3d

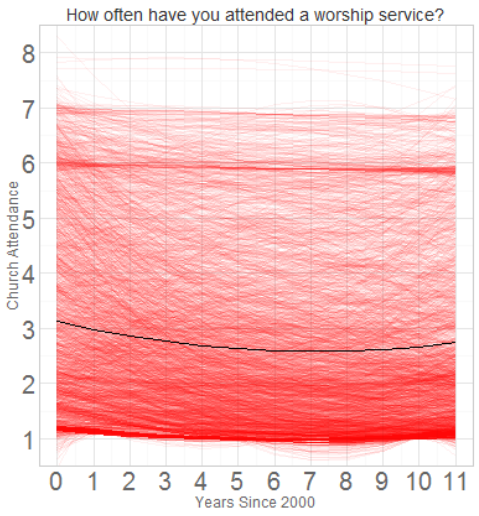
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

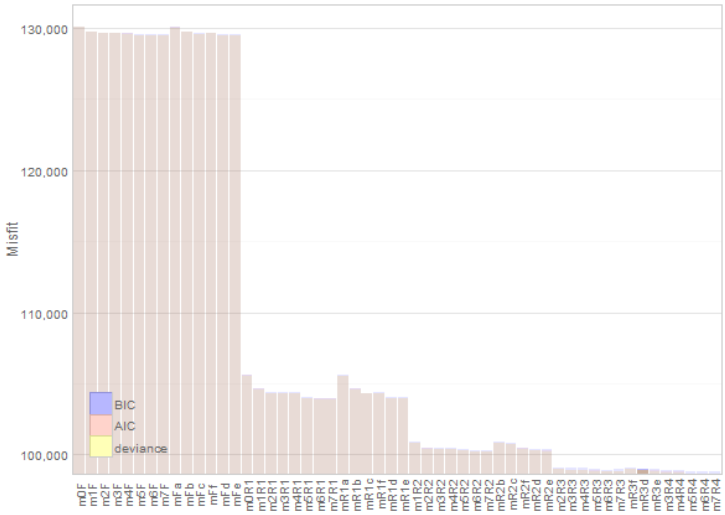
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.95	0.07	43.11	1.91	3.66	-0.37	0.02		0.92
timec	-0.13	0.01	-11.53	0.41	-0.37	0.17	-0.01		0.92
timec2	0.01	0.00	13.12	0.03	0.02	-0.01	0.00		0.92
timec3									
cohort	0.17	0.03	6.58						0.92
timec:cohort	-0.02	0.00	-9.12						0.92
timec2:cohort									
timec3:cohort									





0.48 mR3e

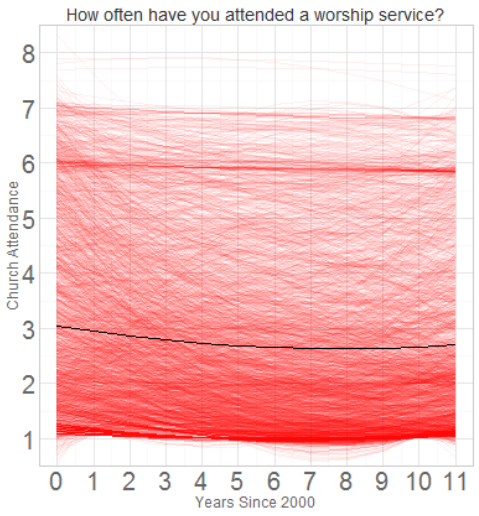
$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \varepsilon_{ti}$$

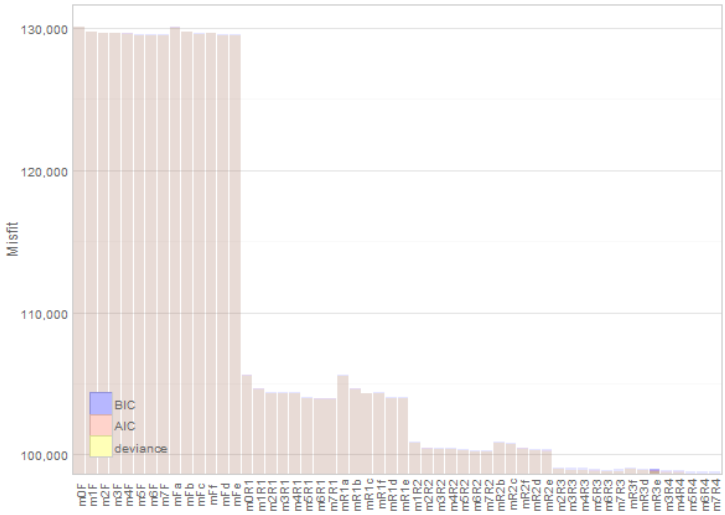
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{31} cohort_{i} + u_{2i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.81	0.07	39.08	1.91	3.65	-0.36	0.02		0.92
timec	-0.04	0.02	-2.50	0.41	-0.36	0.17	-0.01		0.92
timec2	0.00	0.00	2.34	0.03	0.02	-0.01	0.00		0.92
timec3									
cohort	0.24	0.03	8.34						0.92
timec:cohort	-0.06	0.01	-8.69						0.92
timec2:cohort	0.00	0.00	5.97						0.92
timec3:cohort									





0.49 m3R4 – 4 Random

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

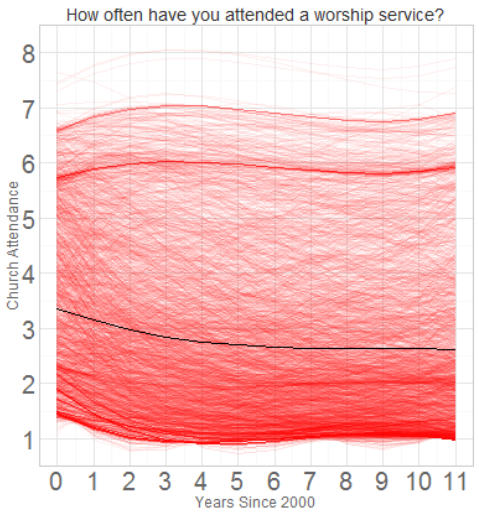
$$\beta_{0i} = \gamma_{00} + u_{0i}$$

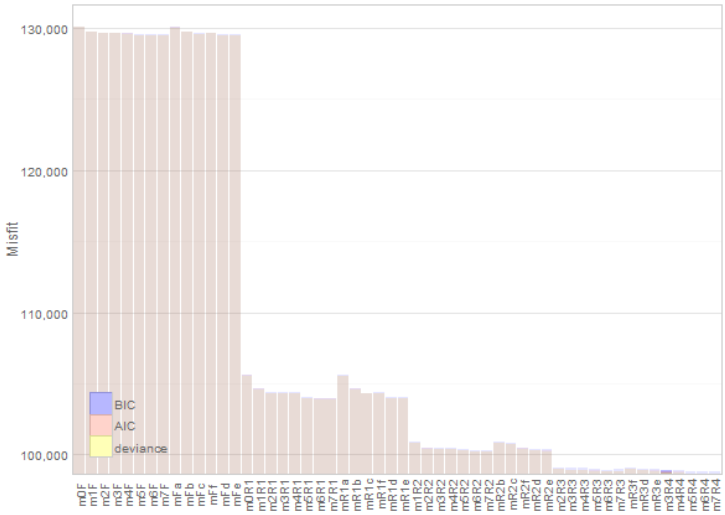
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + u_{3i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.37	0.03	99.80	1.53	2.33	0.00	-0.04	0.00	0.90
timec	-0.24	0.02	-13.10	0.69	0.00	0.48	-0.09	0.00	0.90
timec2	0.03	0.00	6.96	0.14	-0.04	-0.09	0.02	-0.00	0.90
timec3	-0.00	0.00	-4.48	0.01	0.00	0.00	-0.00	0.00	0.90
cohort									
timec:cohort									
timec2:cohort									
timec3:cohort									





0.50 m4R4

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

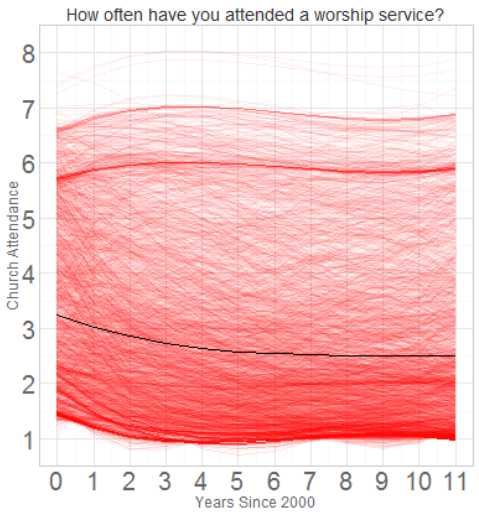
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

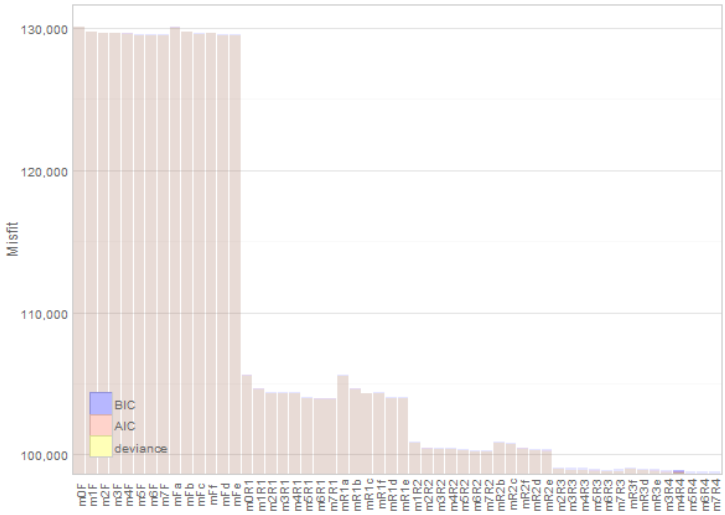
$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + u_{3i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	3.13	0.05	57.83	1.49	2.21	-0.06	-0.02	0.00	0.90
timec	-0.24	0.02	-12.81	0.72	-0.06	0.52	-0.10	0.00	0.90
timec2	0.03	0.00	6.88	0.14	-0.02	-0.10	0.02	-0.00	0.90
timec3	-0.00	0.00	-4.46	0.01	0.00	0.00	-0.00	0.00	0.90
cohort	0.11	0.02	5.39						0.90
timec:cohort									
timec2:cohort									
timec3:cohort									





0.51 m5R4

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

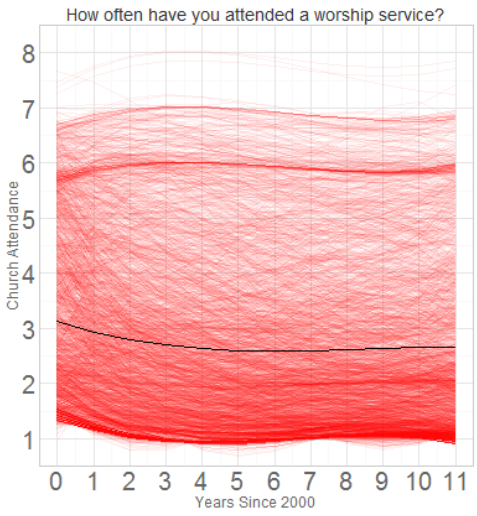
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

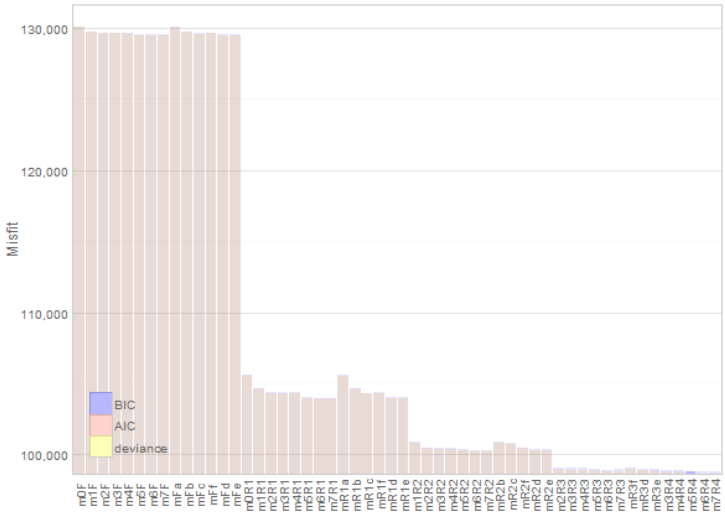
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + u_{3i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.93	0.06	50.56	1.49	2.21	-0.09	-0.01	0.00	0.90
timec	-0.19	0.02	-9.81	0.74	-0.09	0.55	-0.10	0.01	0.90
timec2	0.03	0.00	6.78	0.15	-0.01	-0.10	0.02	-0.00	0.90
timec3	-0.00	0.00	-4.40	0.01	0.00	0.01	-0.00	0.00	0.90
cohort	0.21	0.02	9.25						0.90
timec:cohort	-0.02	0.00	-10.34						0.90
timec2:cohort									
timec3:cohort									





0.52 m6R4

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

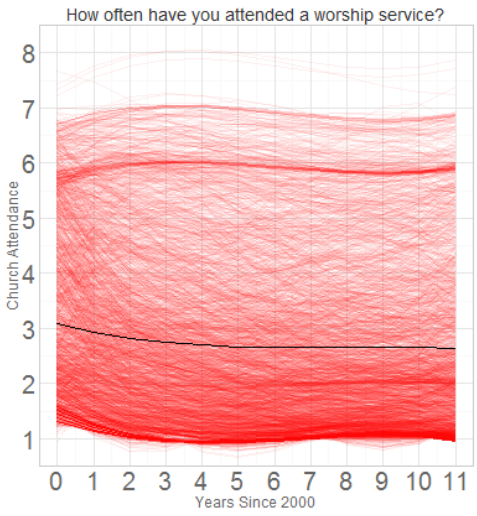
$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

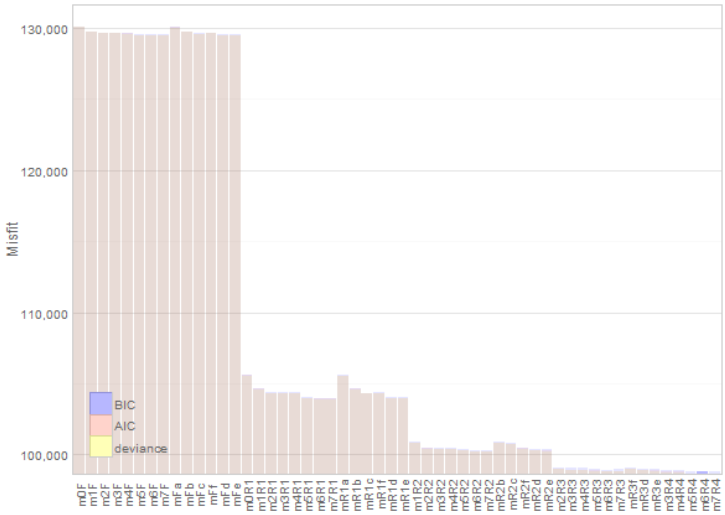
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + u_{3i}$$

	Estimate	Std.Error	t.value	sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
(Intercept)	2.85	0.06	47.93	1.48	2.20	-0.08	-0.01	0.00	0.90
timec	-0.12	0.02	-4.83	0.77	-0.08	0.59	-0.11	0.01	0.90
timec2	0.02	0.00	4.78	0.15	-0.01	-0.11	0.02	-0.00	0.90
timec3	-0.00	0.00	-4.30	0.01	0.00	0.01	-0.00	0.00	0.90
cohort	0.25	0.02	10.51						0.90
timec:cohort	-0.06	0.01	-8.97						0.90
timec2:cohort	0.00	0.00	5.86						0.90
timec3:cohort									





0.53 m7R4

$$y_{ti} = \beta_{0i} + \beta_{1i} timec_{t} + \beta_{2i} timec^{2}_{t} + \beta_{3i} timec^{3}_{t} + \varepsilon_{ti}$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} cohort_{i} + u_{0i}$$

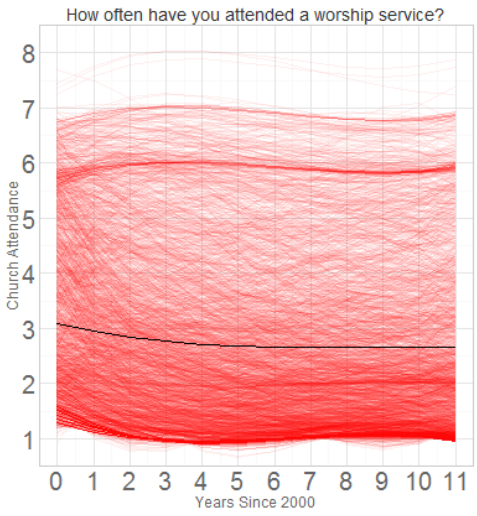
$$\beta_{1i} = \gamma_{10} + \gamma_{11} cohort_{i} + u_{1i}$$

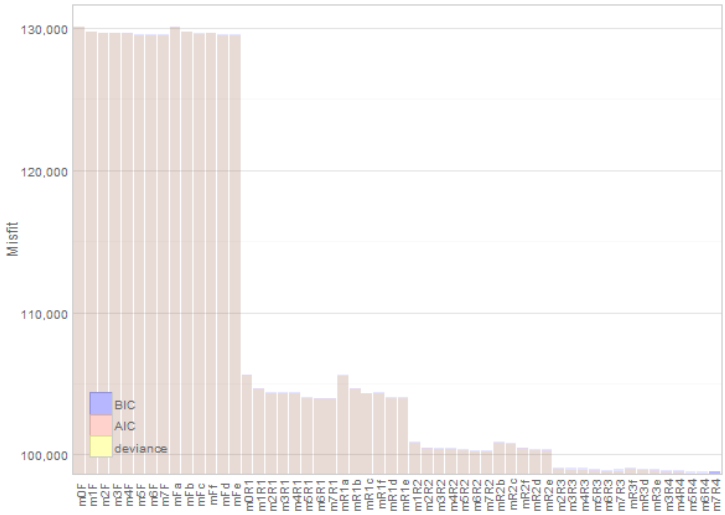
$$\beta_{2i} = \gamma_{20} + \gamma_{21} cohort_{i} + u_{2i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31} cohort_{i} + u_{3i}$$

	Estimate	Std.Error	t.value
(Intercept)	2.84	0.06	47.19
timec	-0.08	0.03	-2.22
timec2	0.01	0.01	1.54
timec3	-0.00	0.00	-1.14
cohort	0.25	0.02	10.51
timec:cohort	-0.08	0.01	-5.69
timec2:cohort	0.01	0.00	2.62
timec3:cohort	-0.00	0.00	-1.53

sdRE	intVarRE	timecVarRE	timec2VarRE	timec3VarRE	sigma
1.50	2.25	-0.07	-0.02	0.00	0.90
0.74	-0.07	0.55	-0.10	0.01	0.90
0.15	-0.02	-0.10	0.02	-0.00	0.90
0.01	0.00	0.01	-0.00	0.00	0.90
					0.90
					0.90
					0.90
					0.90





1 Model specification

The general case for the latent curve models used in the study is:

$$\mathbf{y}_i = \boldsymbol{\Lambda}\boldsymbol{\eta}_i + \boldsymbol{\varepsilon}_i$$
$$\boldsymbol{\eta}_i = \boldsymbol{\mu}_\eta + \boldsymbol{\Gamma}\mathbf{w}_i + \boldsymbol{\zeta}_i$$

$$\mathbf{y}_i = \boldsymbol{\Lambda}\boldsymbol{\mu}_\eta + \boldsymbol{\Lambda}\boldsymbol{\Gamma}\mathbf{w}_i + \boldsymbol{\Lambda}\boldsymbol{\zeta}_i + \boldsymbol{\varepsilon}_i$$

Bollen & Curran (2006)

$$\mathbf{y}_i = \begin{bmatrix} y_{i1} \\ y_{i2} \\ \vdots \\ y_{iT} \end{bmatrix} \quad \boldsymbol{\eta}_i = \begin{bmatrix} \alpha_i \\ \beta_{1i} \\ \vdots \\ \beta_{Pi} \end{bmatrix} \quad \boldsymbol{\mu}_\eta = \begin{bmatrix} \mu_\alpha \\ \mu_{\beta 1} \\ \vdots \\ \mu_{\beta P} \end{bmatrix} \quad \boldsymbol{\Gamma} = \begin{bmatrix} \gamma_{\alpha 1} & \gamma_{\alpha 2} & \cdots & \gamma_{\alpha K} \\ \gamma_{\beta 11} & \gamma_{\beta 12} & \cdots & \gamma_{\beta 1K} \\ \vdots & \vdots & \ddots & \vdots \\ \gamma_{\beta P1} & \gamma_{\beta P1} & \cdots & \gamma_{\beta PK} \end{bmatrix} \quad \mathbf{w}_i = \begin{bmatrix} w_{1i} \\ w_{2i} \\ \vdots \\ w_{Ki} \end{bmatrix}$$

$$\boldsymbol{\Lambda} = \begin{bmatrix} 1 & 0 & \cdots & 0 \\ 1 & 1 & \cdots & 1 \\ \vdots & \vdots & \ddots & \vdots \\ 1 & (T-1)^1 & \cdots & (T-1)^n \end{bmatrix} \quad \boldsymbol{\zeta}_i = \begin{bmatrix} \zeta_\alpha \\ \zeta_{\beta 1} \\ \vdots \\ \zeta_{\beta P} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ \vdots \\ 0 \end{bmatrix}, \begin{bmatrix} \psi_{\alpha\alpha} & & & \\ \psi_{\alpha\beta 1} & \psi_{\beta 1\beta 1} & \ddots & \\ \vdots & \vdots & & \\ \psi_{\alpha\beta P} & \psi_{\beta 1\beta P} & \cdots & \psi_{\beta P\beta P} \end{bmatrix} \right) \quad \boldsymbol{\varepsilon}_i = \begin{bmatrix} \varepsilon_{i1} \\ \varepsilon_{i1} \\ \vdots \\ \varepsilon_{iT} \end{bmatrix}$$

$$y_{ti} = \beta_{0i} + \beta_{1i} time_{1t} + \beta_{2i} time_{2t} \ldots + \beta_{Pi} time_{Pt} + \varepsilon_{ti}$$

Snijders & Bosker (2011)

$$\varepsilon_{ti} \sim N\left([0], [\sigma^2]\right)$$

$$\beta_{0i} = \gamma_{00} + \gamma_{01} w_{1i} + \gamma_{01} w_{2i} + \ldots + \gamma_{0K} w_{Ki} + u_{0i}$$
$$\beta_{1i} = \gamma_{10} + \gamma_{11} w_{1i} + \gamma_{12} w_{2i} + \ldots + \gamma_{0K} w_{Ki} + u_{1i}$$
$$\vdots \quad \vdots \quad \vdots$$
$$\beta_{Pi} = \gamma_{P0} + \gamma_{P1} w_{1i} + \gamma_{P2} w_{2i} + \ldots + \gamma_{PK} w_{Ki} + u_{Ki}$$

$$\begin{bmatrix} u_{0i} \\ u_{1i} \\ \vdots \\ u_{Pi} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ \vdots \\ 0 \end{bmatrix}, \begin{bmatrix} \tau_{00} & & & \\ \tau_{10} & \tau_{11} & & \\ \vdots & \vdots & \ddots & \\ \tau_{P0} & \tau_{P1} & \cdots & \tau_{PK} \end{bmatrix} \right)$$

$\mathbf{y}_i$ - A vector of responses of individual *i* for times T

$\boldsymbol{\Lambda}$ - Matrix of weights for P functions of time

$\boldsymbol{\eta}_i$ - Vector of person-specific weights for P time effects

$\boldsymbol{\mu}_\eta$ - Vector of fixed effect estimates (mean/intercept)

$\boldsymbol{\Gamma}$ - Matrix of fixed effect estimates for $\mathbf{w}_i$ with K predictors

$\mathbf{w}_i$ - Time invariant random predictors of $\boldsymbol{\eta}_i$

$\boldsymbol{\zeta}_i$ - Random effect estimates

$\boldsymbol{\varepsilon}_i$ - Residual

T - Total number of time points in the data

P - Total number of time effects estimated in addition to mean/intercept

K - Total number of T predictors $\mathbf{w}_i$ on time effects $\boldsymbol{\eta}_i$