Online appendix

Martin G. Søyland

2016-06-26

Prepping data

In order to load the data, the preferred way for for R-users is to use the .rda-file. There is, however, also a .csv-file available in the repository. Further, a the parliamentary experience and youth party experience variable needs to be recoded in order to reproduce the results:

```
load("../data/ministers.rda")
ministers$youthAny <- ifelse(ministers$youthCen==1 | ministers$youthLoc==1, 1, 0)
ministers$parlTen_cum2 <- ifelse(ministers$parlTen_cum > 31, 1, 0)
source("../thesis/R/getmode.R")
```

The paper models

All models require the *survival*-package

```
library(survival)
```

Base model

```
base <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls + age_cen +
                factor(gender) + factor(education_dum) +
                frailty(jurisdiction),
             data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(base)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
##     age_cen + factor(gender) + factor(education_dum) + frailty(jurisdiction),
##     data = ministers, subset = prime_minister == 0 & nsd_id !=
##         299)
##
##   n= 625, number of events= 98
##
##                              coef    se(coef) se2     Chisq DF    p
## resigcalls                   0.22030 0.07188  0.07129  9.39 1.00 0.00220
## age_cen                      0.05519 0.01361  0.01336 16.44 1.00 0.00005
## factor(gender)Female         0.14977 0.24046  0.23404  0.39 1.00 0.53000
## factor(education_dum)Lowe    0.04400 0.26284  0.25737  0.03 1.00 0.87000
## frailty(jurisdiction)                                 12.71 6.57 0.06500
##
##                              exp(coef) exp(-coef) lower .95 upper .95
## resigcalls                       1.246     0.8023    1.0826     1.435
## age_cen                          1.057     0.9463    1.0289     1.085
```

```
## factor(gender)Female            1.162     0.8609     0.7251     1.861
## factor(education_dum)Lowe       1.045     0.9569     0.6243     1.749
##
## Iterations: 7 outer, 28 Newton-Raphson
##      Variance of random effect= 0.1337597   I-likelihood = -534
## Degrees of freedom for terms= 1.0 1.0 0.9 1.0 6.6
## Concordance= 0.694  (se = 0.031 )
## Likelihood ratio test= 44.39  on 10.42 df,    p=3.943e-06
```

Including experience

```
experience <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls +
                    age_cen + factor(gender) + factor(education_dum) +
                    factor(youthAny) + minister_exp_cum_y_lag + factor(parlTen_cum2) +
                    frailty(jurisdiction),
                data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(experience)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
##     age_cen + factor(gender) + factor(education_dum) + factor(youthAny) +
##     minister_exp_cum_y_lag + factor(parlTen_cum2) + frailty(jurisdiction),
##     data = ministers, subset = prime_minister == 0 & nsd_id !=
##         299)
##
##   n= 625, number of events= 98
##
##                            coef    se(coef) se2     Chisq DF   p
## resigcalls                 0.22850 0.07240  0.07190  9.96 1.00 0.0016
## age_cen                    0.04923 0.01498  0.01474 10.80 1.00 0.0010
## factor(gender)Female       0.18165 0.24603  0.23947  0.55 1.00 0.4600
## factor(education_dum)Lowe  0.08434 0.26528  0.25862  0.10 1.00 0.7500
## factor(youthAny)1          0.26140 0.32629  0.32489  0.64 1.00 0.4200
## minister_exp_cum_y_lag     0.10404 0.03791  0.03714  7.53 1.00 0.0061
## factor(parlTen_cum2)1     -0.31695 0.24551  0.24249  1.67 1.00 0.2000
## frailty(jurisdiction)                               14.24 6.81 0.0430
##
##                            exp(coef) exp(-coef) lower .95 upper .95
## resigcalls                    1.2567    0.7957     1.0905     1.448
## age_cen                       1.0505    0.9520     1.0201     1.082
## factor(gender)Female          1.1992    0.8339     0.7404     1.942
## factor(education_dum)Lowe     1.0880    0.9191     0.6469     1.830
## factor(youthAny)1             1.2987    0.7700     0.6851     2.462
## minister_exp_cum_y_lag        1.1096    0.9012     1.0302     1.195
## factor(parlTen_cum2)1         0.7284    1.3729     0.4502     1.179
##
## Iterations: 5 outer, 24 Newton-Raphson
##      Variance of random effect= 0.1442913   I-likelihood = -530
## Degrees of freedom for terms= 1.0 1.0 0.9 1.0 1.0 1.0 1.0 6.8
## Concordance= 0.719  (se = 0.031 )
## Likelihood ratio test= 53.5  on 13.59 df,    p=1.156e-06
```

Cabinet attributes

```
cab <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls +
             age_cen + factor(gender) + factor(education_dum) +
             factor(CabinetType) + factor(structure)+
             frailty(jurisdiction),
           data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(cab)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
##     age_cen + factor(gender) + factor(education_dum) + factor(CabinetType) +
##     factor(structure) + frailty(jurisdiction), data = ministers,
##     subset = prime_minister == 0 & nsd_id != 299)
##
##   n= 625, number of events= 98
##
##                              coef    se(coef) se2     Chisq DF   p
## resigcalls                 0.23821 0.07213  0.07160 10.91 1.00 9.6e-04
## age_cen                    0.05722 0.01378  0.01351 17.25 1.00 3.3e-05
## factor(gender)Female       0.25660 0.24853  0.24124  1.07 1.00 3.0e-01
## factor(education_dum)Lowe -0.08365 0.27006  0.26383  0.10 1.00 7.6e-01
## factor(CabinetType)Majori  0.18821 0.22151  0.22042  0.72 1.00 4.0e-01
## factor(structure)Coalitio -0.50066 0.24287  0.24140  4.25 1.00 3.9e-02
## frailty(jurisdiction)                               13.00 6.56 5.8e-02
##
##                            exp(coef) exp(-coef) lower .95 upper .95
## resigcalls                   1.2690    0.7880    1.1017    1.4617
## age_cen                      1.0589    0.9444    1.0307    1.0879
## factor(gender)Female         1.2925    0.7737    0.7941    2.1037
## factor(education_dum)Lowe    0.9198    1.0872    0.5417    1.5615
## factor(CabinetType)Majori    1.2071    0.8284    0.7820    1.8633
## factor(structure)Coalitio    0.6061    1.6498    0.3766    0.9757
##
## Iterations: 7 outer, 29 Newton-Raphson
##      Variance of random effect= 0.1349566   I-likelihood = -531.7
## Degrees of freedom for terms= 1.0 1.0 0.9 1.0 1.0 1.0 6.6
## Concordance= 0.699  (se = 0.031 )
## Likelihood ratio test= 48.94  on 12.39 df,    p=2.88e-06
```

Full model

```
all <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls + age_cen + factor(gender) +
             factor(youthAny) + minister_exp_cum_y_lag + factor(parlTen_cum2) +
             factor(education_dum) +  factor(CabinetType) + factor(structure) + frailty(jurisdiction)
           data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(all)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
```

```
##     age_cen + factor(gender) + factor(youthAny) + minister_exp_cum_y_lag +
##     factor(parlTen_cum2) + factor(education_dum) + factor(CabinetType) +
##     factor(structure) + frailty(jurisdiction), data = ministers,
##     subset = prime_minister == 0 & nsd_id != 299)
##
##   n= 625, number of events= 98
##
##                           coef    se(coef) se2    Chisq DF   p
## resigcalls                 0.23767 0.07270  0.07224 10.69 1.00 0.00110
## age_cen                    0.05243 0.01536  0.01510 11.66 1.00 0.00064
## factor(gender)Female       0.27588 0.25615  0.24895  1.16 1.00 0.28000
## factor(youthAny)1          0.30081 0.32923  0.32783  0.83 1.00 0.36000
## minister_exp_cum_y_lag     0.09055 0.03939  0.03861  5.29 1.00 0.02200
## factor(parlTen_cum2)1     -0.26774 0.24800  0.24458  1.17 1.00 0.28000
## factor(education_dum)Lowe -0.02525 0.27599  0.26884  0.01 1.00 0.93000
## factor(CabinetType)Majori  0.15917 0.22188  0.22070  0.51 1.00 0.47000
## factor(structure)Coalitio -0.38202 0.25748  0.25590  2.20 1.00 0.14000
## frailty(jurisdiction)                              14.34 6.77 0.04000
##
##                          exp(coef) exp(-coef) lower .95 upper .95
## resigcalls                 1.2683    0.7885    1.0999    1.463
## age_cen                    1.0538    0.9489    1.0226    1.086
## factor(gender)Female       1.3177    0.7589    0.7976    2.177
## factor(youthAny)1          1.3510    0.7402    0.7086    2.576
## minister_exp_cum_y_lag     1.0948    0.9134    1.0134    1.183
## factor(parlTen_cum2)1      0.7651    1.3070    0.4706    1.244
## factor(education_dum)Lowe  0.9751    1.0256    0.5677    1.675
## factor(CabinetType)Majori  1.1725    0.8529    0.7590    1.811
## factor(structure)Coalitio  0.6825    1.4652    0.4120    1.130
##
## Iterations: 5 outer, 24 Newton-Raphson
##     Variance of random effect= 0.1443318   I-likelihood = -528.8
## Degrees of freedom for terms= 1.0 1.0 0.9 1.0 1.0 1.0 0.9 1.0 1.0 6.8
## Concordance= 0.719  (se = 0.031 )
## Likelihood ratio test= 55.8  on 15.52 df,   p=1.891e-06
```

Robustness models

Age squared

```r
agesq <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls + poly(age_cen, 2, raw = FALSE) + factor(ge
               factor(youthAny) + minister_exp_cum_y_lag + factor(parlTen_cum2) +
               factor(education_dum) +  factor(CabinetType) + factor(structure) + frailty(jurisdictio
            data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(agesq)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
##     poly(age_cen, 2, raw = FALSE) + factor(gender) + factor(youthAny) +
##     minister_exp_cum_y_lag + factor(parlTen_cum2) + factor(education_dum) +
##     factor(CabinetType) + factor(structure) + frailty(jurisdiction),
##     data = ministers, subset = prime_minister == 0 & nsd_id !=
```

```
##          299)
##
##   n= 625, number of events= 98
##
##                          coef    se(coef) se2    Chisq DF  p
## resigcalls               0.23741 0.07290  0.07244 10.60 1.00 0.00110
## poly(age_cen, 2, raw = FA 11.36310 3.42495  3.39359 11.01 1.00 0.00091
## poly(age_cen, 2, raw = FA -1.12655 2.82169  2.78583  0.16 1.00 0.69000
## factor(gender)Female      0.28226 0.25673  0.24960  1.21 1.00 0.27000
## factor(youthAny)1         0.30763 0.32966  0.32826  0.87 1.00 0.35000
## minister_exp_cum_y_lag    0.09253 0.03963  0.03880  5.45 1.00 0.02000
## factor(parlTen_cum2)1    -0.26649 0.24797  0.24460  1.15 1.00 0.28000
## factor(education_dum)Lowe -0.01972 0.27570  0.26856  0.01 1.00 0.94000
## factor(CabinetType)Majori 0.16888 0.22274  0.22178  0.57 1.00 0.45000
## factor(structure)Coalitio -0.38694 0.25761  0.25610  2.26 1.00 0.13000
## frailty(jurisdiction)                            14.47 6.81 0.03900
##
##                          exp(coef) exp(-coef) lower .95 upper .95
## resigcalls               1.268e+00  7.887e-01 1.099e+00 1.463e+00
## poly(age_cen, 2, raw = FA 8.609e+04  1.162e-05 1.046e+02 7.084e+07
## poly(age_cen, 2, raw = FA 3.241e-01  3.085e+00 1.285e-03 8.177e+01
## factor(gender)Female      1.326e+00  7.541e-01 8.018e-01 2.193e+00
## factor(youthAny)1         1.360e+00  7.352e-01 7.128e-01 2.595e+00
## minister_exp_cum_y_lag    1.097e+00  9.116e-01 1.015e+00 1.186e+00
## factor(parlTen_cum2)1    7.661e-01  1.305e+00 4.712e-01 1.245e+00
## factor(education_dum)Lowe 9.805e-01  1.020e+00 5.712e-01 1.683e+00
## factor(CabinetType)Majori 1.184e+00  8.446e-01 7.652e-01 1.832e+00
## factor(structure)Coalitio 6.791e-01  1.472e+00 4.099e-01 1.125e+00
##
## Iterations: 5 outer, 25 Newton-Raphson
##      Variance of random effect= 0.146571   I-likelihood = -528.8
## Degrees of freedom for terms= 1.0 1.9 0.9 1.0 1.0 1.0 0.9 1.0 1.0 6.8
## Concordance= 0.718  (se = 0.031 )
## Likelihood ratio test= 56.13  on 16.54 df,    p=3.337e-06
```

The close to linear relationship between durability and age squared can easily be shown by ploting the regression line for each value on age:

```r
pred1 <- with(ministers, data.frame(resigcalls=min(resigcalls),
                          age_cen=round(min(age_cen),
                                    digits = 0):round(max(age_cen),
                                              digits = 0),
                          gender=getmode(gender),
                          minister_exp_cum_y_lag=median(minister_exp_cum_y_lag),
                          parlTen_cum2=getmode(parlTen_cum2),
                          youthAny=getmode(youthAny),
                          education_dum=getmode(education_dum),
                          CabinetType=getmode(CabinetType),
                          structure=getmode(structure)))

pred_plot <- data.frame(predict(agesq, newdata=pred1,
                          type="risk", se=TRUE, reference="sample"), pred1)

pred_plot$upper <- pred_plot$fit+1.96*pred_plot$se.fit
```

```
pred_plot$lower <- pred_plot$fit-1.96*pred_plot$se.fit
pred_plot$age_cen <- pred_plot$age_cen + median(ministers$age)

ggplot(pred_plot, aes(x=age_cen, y=fit))+
  geom_line(stat="identity", color="black")+
  geom_ribbon(aes(ymax=upper, ymin=lower, color=NULL), alpha=.2, fill="black") +
  geom_hline(aes(yintercept=1), linetype="dashed")+
  labs(y="Hazard Ratios", x="Resignation calls per year")+
  scale_x_continuous(breaks=seq(0,2,.25), expand=c(0,0))+
  scale_y_continuous(breaks=seq(0,10,.5), expand=c(0,.21))+
  theme(legend.position=c(.15,.9),
        panel.grid.major.x=element_blank(),
        panel.grid.minor=element_blank(),
        panel.border=element_blank(),
        strip.background=element_blank(),
        panel.margin=unit(1, "cm"),
        axis.line=element_line(lineend = "square"),
        axis.title.y=element_text(vjust=1.5, siz=12),
        axis.title.x=element_text(vjust=0, size=12))
```
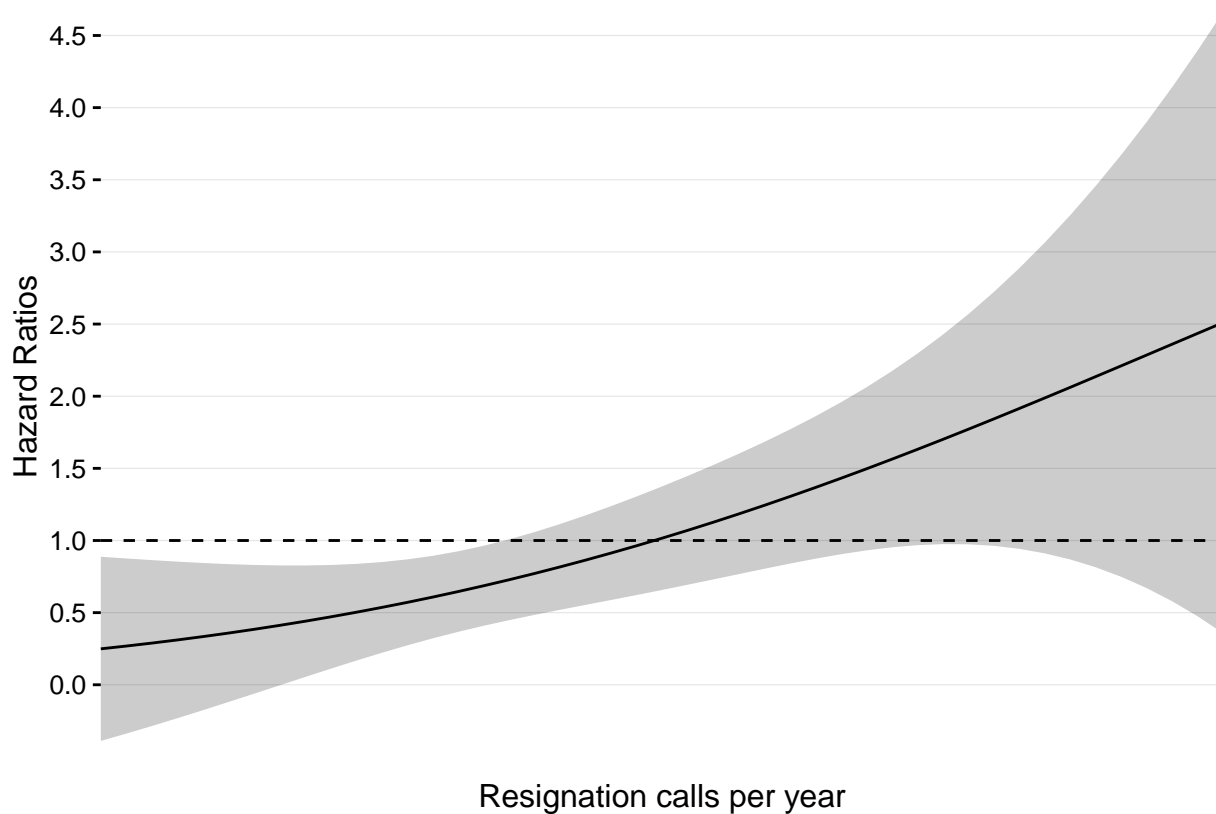

Parliamentary experience == in parliament > 0 days

The following example shows how parliamentary experience does matter when it is coded as 1 when a minister has been in parliament more than 0 days:

```
ministers$parlTen_cum3 <- ifelse(ministers$parlTen_cum > 0, 1, 0)
parl_onday <- coxph(Surv(dur_start, dur_end, event2) ~ resigcalls + age_cen +
                    factor(gender) + factor(youthAny) + minister_exp_cum_y_lag +
                    factor(parlTen_cum3) + factor(education_dum) +
                    factor(CabinetType) + factor(structure) + frailty(jurisdiction),
                data=ministers, subset=prime_minister==0 & nsd_id!=299)
summary(parl_onday)
```

```
## Call:
## coxph(formula = Surv(dur_start, dur_end, event2) ~ resigcalls +
##     age_cen + factor(gender) + factor(youthAny) + minister_exp_cum_y_lag +
##     factor(parlTen_cum3) + factor(education_dum) + factor(CabinetType) +
##     factor(structure) + frailty(jurisdiction), data = ministers,
##     subset = prime_minister == 0 & nsd_id != 299)
##
##   n= 625, number of events= 98
##
##                            coef    se(coef) se2     Chisq DF   p
## resigcalls               0.26373 0.07322  0.07281 12.97 1.00 0.00032
## age_cen                  0.05736 0.01546  0.01519 13.76 1.00 0.00021
## factor(gender)Female     0.32555 0.25727  0.24953  1.60 1.00 0.21000
## factor(youthAny)1        0.55698 0.34521  0.34323  2.60 1.00 0.11000
## minister_exp_cum_y_lag   0.10786 0.04033  0.03962  7.15 1.00 0.00750
## factor(parlTen_cum3)1   -0.64554 0.27150  0.26820  5.65 1.00 0.01700
## factor(education_dum)Lowe 0.06496 0.27646  0.26979  0.06 1.00 0.81000
## factor(CabinetType)Majori 0.16979 0.21992  0.21868  0.60 1.00 0.44000
## factor(structure)Coalitio -0.32682 0.25661 0.25510  1.62 1.00 0.20000
## frailty(jurisdiction)                            14.03 6.68 0.04300
##
##                            exp(coef) exp(-coef) lower .95 upper .95
## resigcalls                  1.3018     0.7682    1.1277    1.5026
## age_cen                     1.0590     0.9443    1.0274    1.0916
## factor(gender)Female        1.3848     0.7221    0.8364    2.2928
## factor(youthAny)1           1.7454     0.5729    0.8873    3.4335
## minister_exp_cum_y_lag      1.1139     0.8977    1.0292    1.2055
## factor(parlTen_cum3)1       0.5244     1.9070    0.3080    0.8928
## factor(education_dum)Lowe   1.0671     0.9371    0.6207    1.8346
## factor(CabinetType)Majori   1.1851     0.8438    0.7701    1.8236
## factor(structure)Coalitio   0.7212     1.3865    0.4362    1.1926
##
## Iterations: 5 outer, 24 Newton-Raphson
##      Variance of random effect= 0.1413044   I-likelihood = -526.5
## Degrees of freedom for terms= 1.0 1.0 0.9 1.0 1.0 1.0 1.0 1.0 1.0 6.7
## Concordance= 0.717  (se = 0.031 )
## Likelihood ratio test= 60.3  on 15.43 df,   p=3.084e-07
```

Resiganation call coding scheme

Fixed string	Varying string
"Minister name" AND	"gå* av*"
	"må* gå*"

Fixed string	Varying string
	"bør* gå *"
	"burde* gå *"
	"skulle* gå *"
	"trekke* seg"
	"avgang*"
	"avskjed*"
	"vurder* sin"
	"vurder* stilling*"
	"vurder* posisjon*"
	"fratre*"
	"takk* av"
	"tre* tilb*"
	"avsett*"
	"avsatt"
	"skift* ut"
	"mistill*"