

# minnesota\_recidivism

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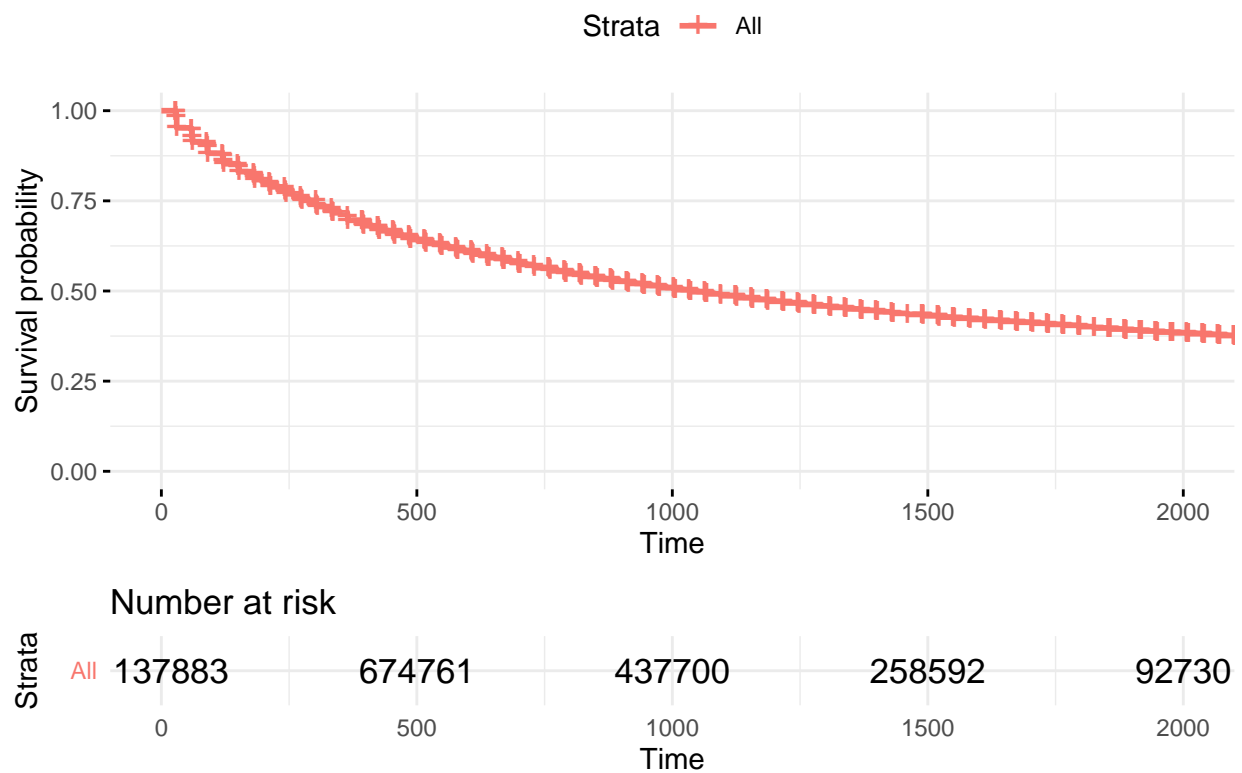
Person/Case Data

Financial Data

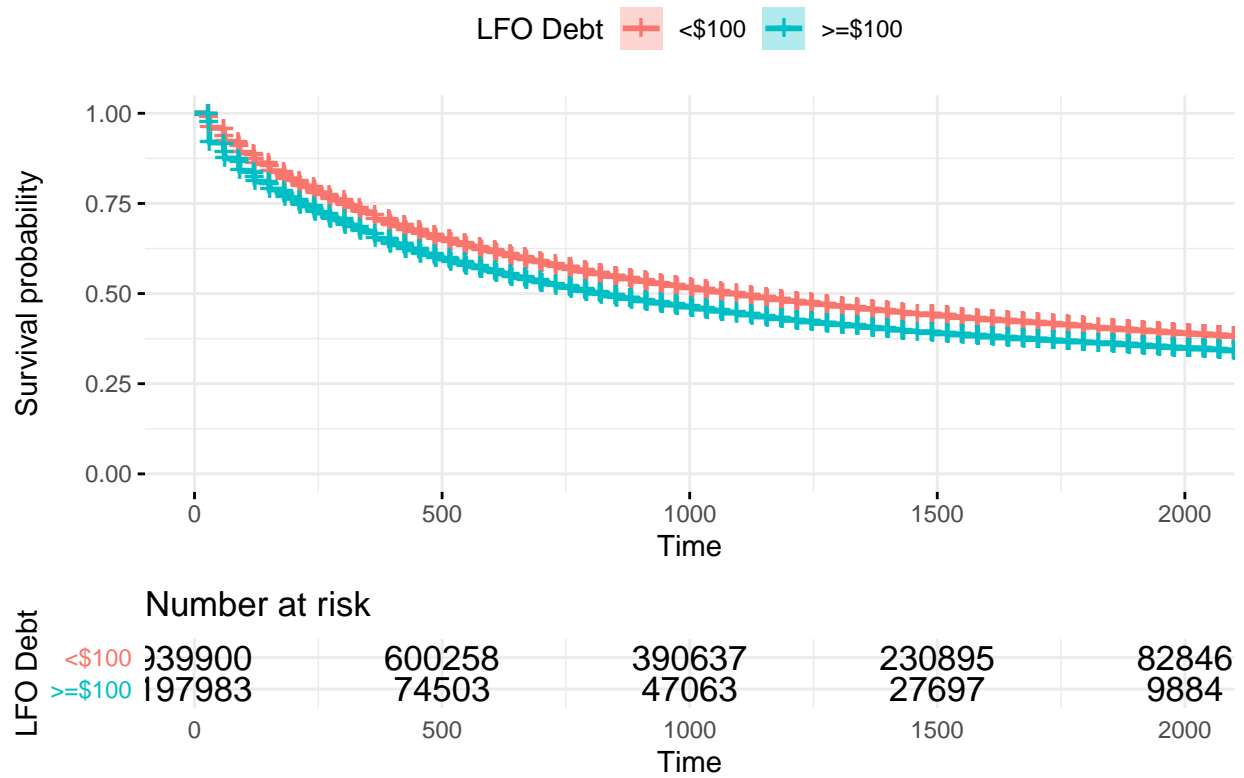
Event History Framework - Time Until Second Case

Kaplan-Meier Plots

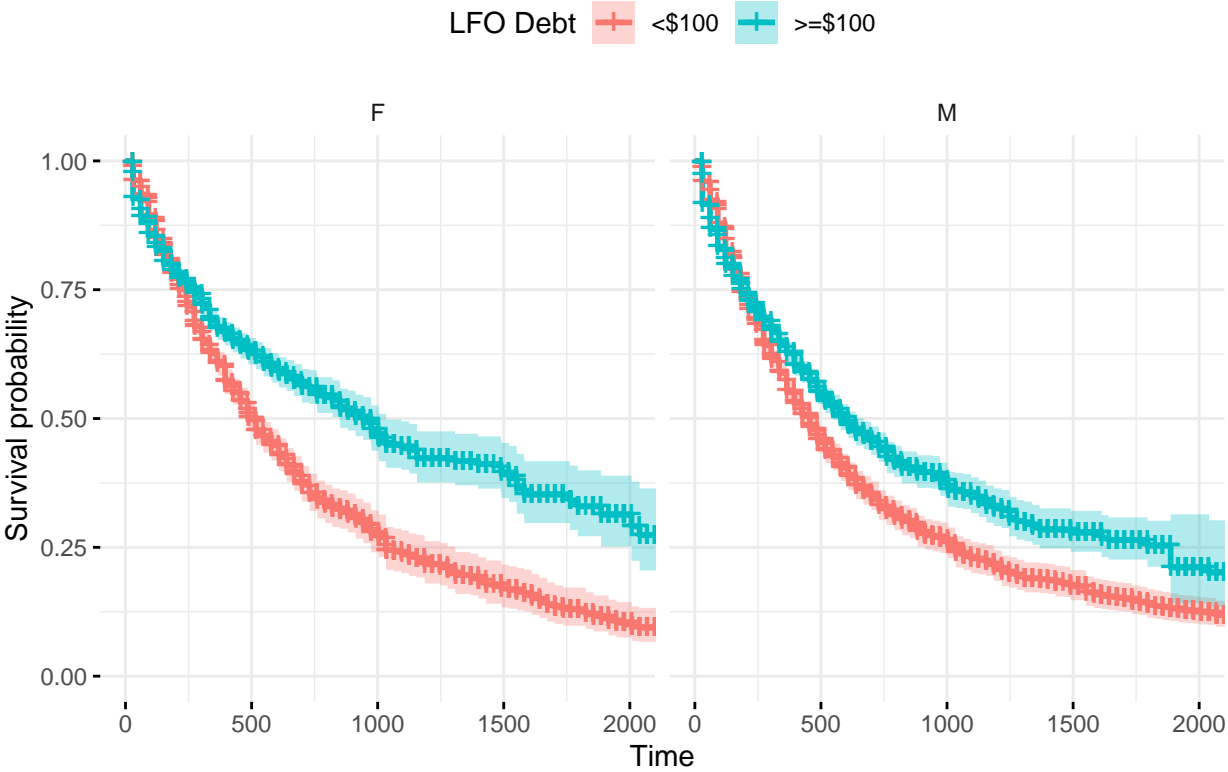
Kaplan–Meier Plot of Recidivism: Minnesota 2010–2015



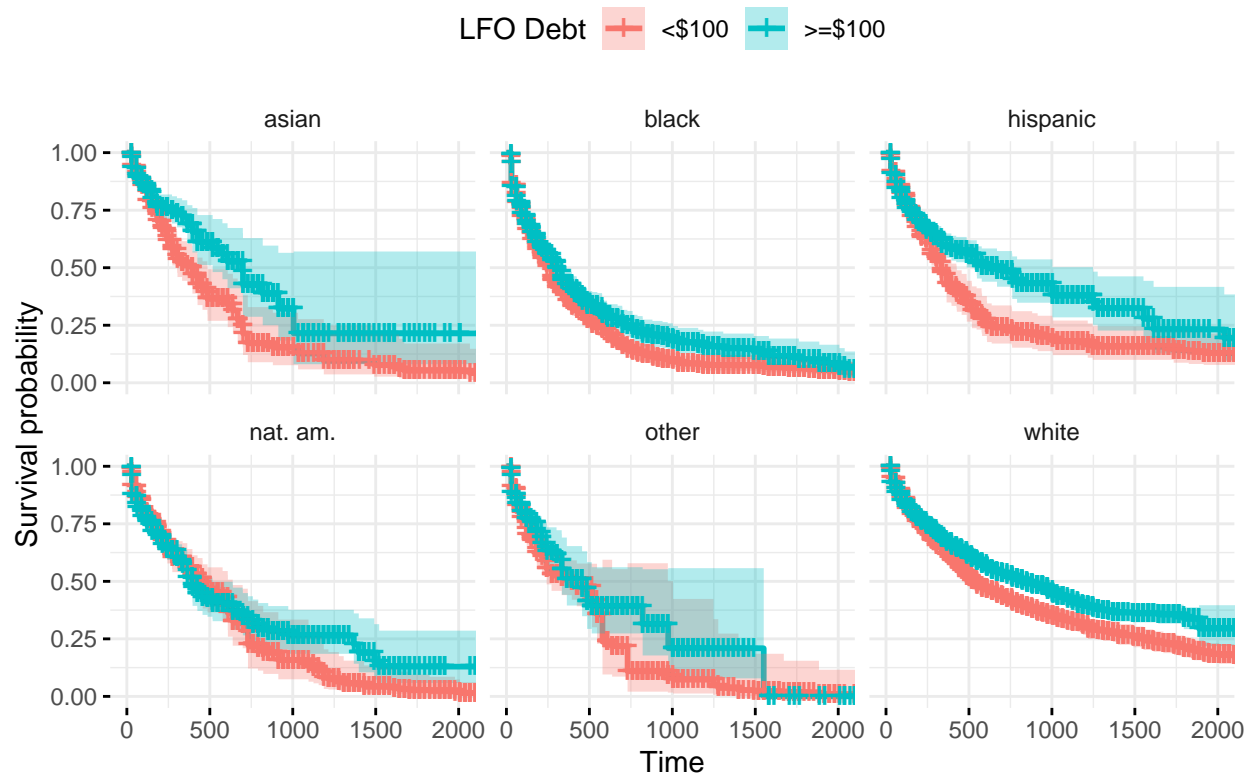
Kaplan–Meier Plot of Recidivism by LFO Debt: Minnesota 2010–2015



Kaplan–Meier Plot of Recidivism by Gender: Minnesota 2010–2015



## Kaplan–Meier Plot of Recidivism by Race: Minnesota 2010–2015



## Cox Proportional hazards Model

```
## Call:
## coxph(formula = Surv(time = enter, time2 = exit, event = event) ~
##       age + gender_impute + race_impute + age + pubdef + charge_offense +
##       charge_degree + priors + trial_flag + lfo_debt, data = eha)
##
## n= 153221, number of events= 5710
## (32648970 observations deleted due to missingness)
##
##               coef exp(coef) se(coef)      z
## age             -1.972e-02  9.805e-01  1.100e-03 -17.926
## gender_imputeM    2.773e-01  1.320e+00  2.914e-02   9.517
## race_imputeblack   3.657e-01  1.441e+00  8.280e-02   4.416
## race_imputehispanic 8.532e-02  1.089e+00  9.184e-02   0.929
## race_imputenat. am. 4.995e-01  1.648e+00  9.214e-02   5.421
## race_imputeother   1.982e-01  1.219e+00  1.180e-01   1.680
## race_imputewhite   1.108e-01  1.117e+00  8.030e-02   1.380
## pubdefyes         4.651e-01  1.592e+00  3.171e-02  14.668
## charge_offensedrug  3.472e-01  1.415e+00  6.493e-02   5.348
## charge_offensehunt/fish 2.849e-01  1.330e+00  2.899e-01   0.983
## charge_offenseother 2.047e-01  1.227e+00  3.587e-02   5.706
## charge_offenseviolent 1.776e-01  1.194e+00  4.136e-02   4.295
## charge_degrefelony  1.843e-01  1.202e+00  1.875e-01   0.983
## charge_degreetgross misdemeanor 2.503e-01  1.284e+00  1.888e-01   1.325
```

```

## charge_degreemisdemeanor      4.016e-01  1.494e+00  1.865e-01  2.154
## charge_degreetetty misdemeanor 2.155e-01  1.240e+00  2.032e-01  1.060
## priors                        1.344e-01  1.144e+00  6.744e-03  19.922
## trial_flagTRUE                 NA          NA  0.000e+00    NA
## lfo_debt                      -8.359e-06  1.000e+00  3.192e-06  -2.619
##                               Pr(>|z|)
## age                           < 2e-16 ***
## gender_imputeM                 < 2e-16 ***
## race_imputeblack               1.00e-05 ***
## race_imputehispanic            0.35285
## race_imputenat. am.            5.92e-08 ***
## race_imputeother               0.09290 .
## race_imputewhite               0.16755
## pubdefyes                      < 2e-16 ***
## charge_offensedrug             8.89e-08 ***
## charge_offensehunt/fish        0.32566
## charge_offenseother            1.16e-08 ***
## charge_offenseviolent          1.75e-05 ***
## charge_degreetfelony           0.32558
## charge_degreetgross misdemeanor 0.18502
## charge_degreemisdemeanor       0.03127 *
## charge_degreetetty misdemeanor 0.28897
## priors                        < 2e-16 ***
## trial_flagTRUE                 NA
## lfo_debt                      0.00882 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##                               exp(coef) exp(-coef) lower .95 upper .95
## age                          0.9805      1.0199      0.9784  0.9826
## gender_imputeM                1.3196      0.7578      1.2463  1.3971
## race_imputeblack              1.4415      0.6937      1.2255  1.6955
## race_imputehispanic           1.0891      0.9182      0.9097  1.3039
## race_imputenat. am.           1.6479      0.6068      1.3756  1.9740
## race_imputeother              1.2192      0.8202      0.9675  1.5363
## race_imputewhite              1.1172      0.8951      0.9545  1.3076
## pubdefyes                     1.5921      0.6281      1.4962  1.6942
## charge_offensedrug            1.4151      0.7066      1.2460  1.6072
## charge_offensehunt/fish       1.3296      0.7521      0.7534  2.3467
## charge_offenseother           1.2272      0.8149      1.1438  1.3165
## charge_offenseviolent         1.1944      0.8373      1.1014  1.2952
## charge_degreetfelony          1.2024      0.8316      0.8326  1.7365
## charge_degreetgross misdemeanor 1.2844      0.7786      0.8871  1.8598
## charge_degreemisdemeanor      1.4941      0.6693      1.0368  2.1533
## charge_degreetetty misdemeanor 1.2405      0.8061      0.8329  1.8475
## priors                       1.1438      0.8743      1.1288  1.1590
## trial_flagTRUE                 NA          NA          NA      NA
## lfo_debt                      1.0000      1.0000      1.0000  1.0000
##
## Concordance= 0.663 (se = 0.004 )
## Likelihood ratio test= 1643 on 18 df,  p=<2e-16
## Wald test              = 1764 on 18 df,  p=<2e-16
## Score (logrank) test = 1827 on 18 df,  p=<2e-16

```

## Fixed Effects Framework

```
panel <- fin.series %>%
  mutate(date = as.Date(paste(date, 01, sep="-"), format = "%Y-%m-%d"),
         sentence_date = as.Date(paste(Sentence_Date, 01, sep="-"), format = "%Y-%m-%d"),
         Case_Filed_Date = as.Date(paste(as.Date(Case_Filed_Date, format = "Y-%m"), 01, sep="-",
                                              format = "%Y-%m-%d"))) %>%
  filter(date >= "2010-01-01") %>% group_by(person_id) %>%
  complete(date = seq.Date(min(date), max(date), by = "month")) %>%
  fill(Case_Mkey, Case_Filed_Date, sentence_date, county, Party_Mkey, gender_impute, race_impute,
       name_full, birth_date, sentence_date, pubdef, charge_offense, charge_degree,
       trial_flag, adj, count) %>%
  mutate(ordered = replace_na(ordered, 0), collected = replace_na(collected, 0),
         age = (date-birth_date)/365.25) %>%
  group_by(person_id) %>%
  mutate(event = ifelse(date==Case_Filed_Date, 1, 0)) %>%
  mutate(cum_order = cumsum(ordered),
         cum_coll = cumsum(collected)) %>%
  ungroup() %>%
  mutate(lfo_debt = cum_order-cum_coll) %>%
  filter(lfo_debt >= 0) #check on this at some point
```