

Zusammenfassung Neu

Kyrrill Guba, Colin Linke, Batuhan Güyelkaya, Vaishali Iyer

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```
df4 <- read.csv("df4.csv", header = TRUE, sep = ",")  
df4_pan<-pdata.frame(df4,index=c("district","week"))  
  
df_pan2<-df4_pan[-(which(df4_pan$week==1)),]  
  
s<-data.frame(c(lag(df_pan2$inzidenz, 1)),c(lag(df_pan2$weightednbins, 1)),  
               c(I(log(df_pan2$density)*lag(df_pan2$inzidenz, 1))),  
               c(I(df_pan2$hotspot*lag(df_pan2$inzidenz,1))),  
               c(I(df_pan2$hotspotnb*lag(df_pan2$weightednbins,1))),  
               c(I(df_pan2$rate_zweitimpf * df_pan2$hotspot)),  
               c(df_pan2$A60.79.Anteil))  
  
colnames(s)<-c("inzidenz1","weightednbins1","density_inzidenz1",  
                "hotspot_inzidenz1", "hotspotnb_wnbins1",  
                "zweitimpf_hotspot","A60.79.Anteil")  
  
pool <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)  
            + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))  
            +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)  
            + A60.79.Anteil  
            + factor(week)  
            , data =df4_pan, model = "pooling")  
  
pool.sqrt <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbins, 1))  
                  + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))  
                  + sqrt(I(hotspotnb * lag(weightednbins, 1))) + sqrt(I(rate_zweitimpf * hotspot))  
                  + A60.79.Anteil  
                  + factor(week)  
                  , data =df4_pan, model = "pooling")  
pool.sqrt2 <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbins, 1))  
                  + I(log(density)*sqrt(lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))  
                  + sqrt(I(hotspotnb * lag(weightednbins, 1))) + sqrt(I(rate_zweitimpf * hotspot))  
                  + A60.79.Anteil  
                  + factor(week)  
                  , data =df4_pan, model = "pooling")  
pool.sqrt3 <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbins, 1))  
                  + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))  
                  + sqrt(I(hotspotnb * lag(weightednbins, 1))) + sqrt(I(rate_zweitimpf * hotspot))  
                  + sqrt(A60.79.Anteil)  
                  + factor(week)  
                  , data =df4_pan, model = "pooling")
```

```

logLik.plm <- function(object){
  out <- -plm::nobs(object) * log(2 * var(object$residuals) * pi)/2 - deviance(object)/(2 * var(object$)

  attr(out,"df") <- nobs(object) - object$df.residual
  attr(out,"nobs") <- plm::nobs(summary(object))
  return(out)
}

stats::AIC(pool.sqrt)

## [1] 57487.66

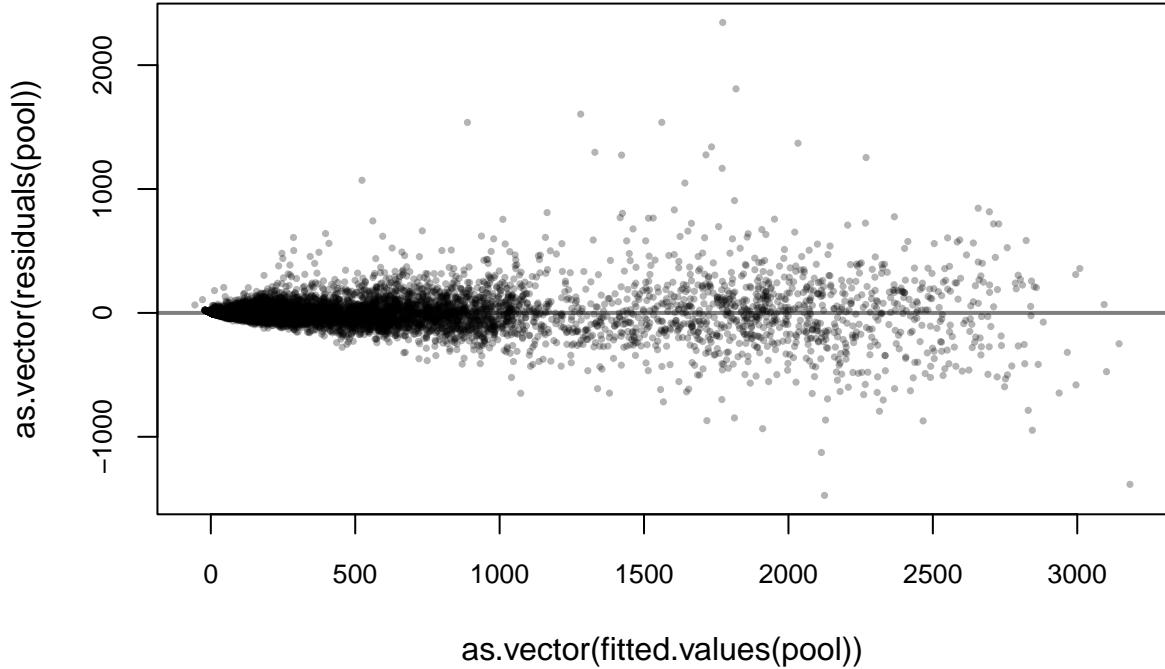
stats::AIC(pool.sqrt2)

## [1] 57488.35

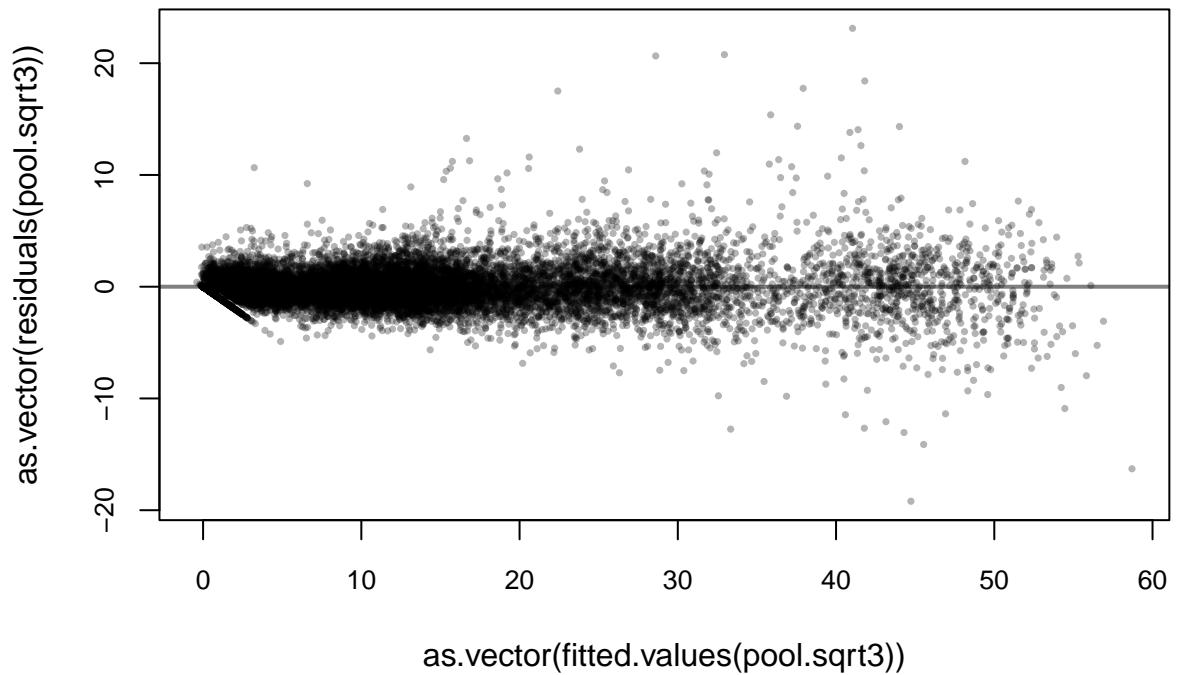
stats::AIC(pool.sqrt3)

## [1] 57486.79

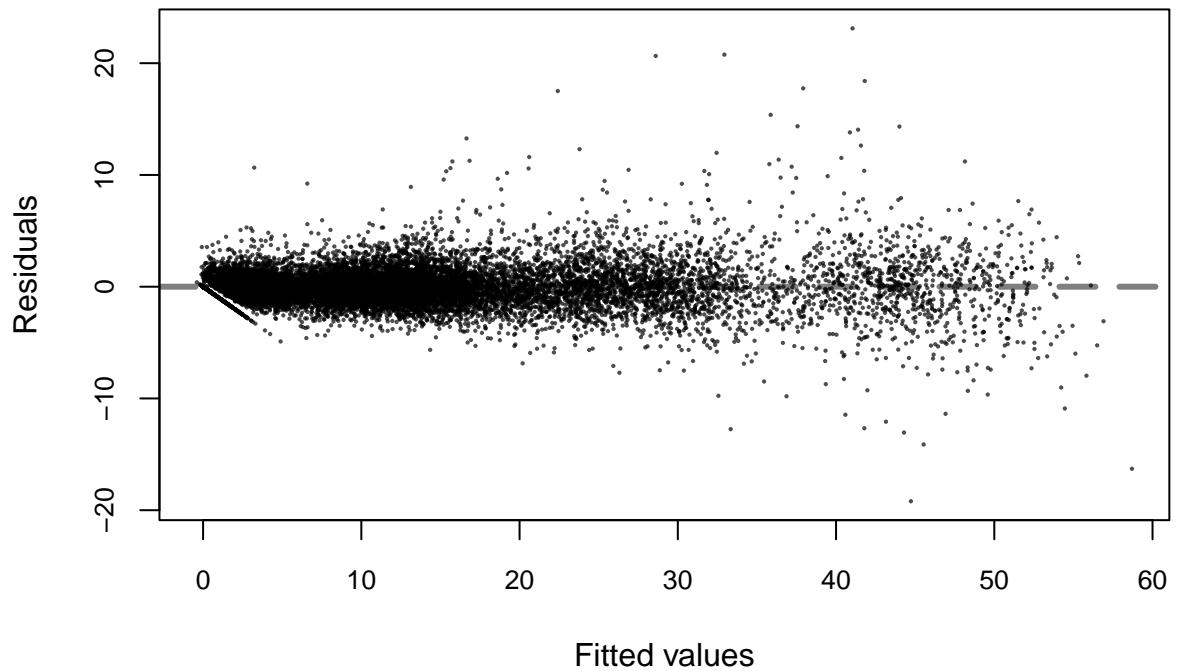
```



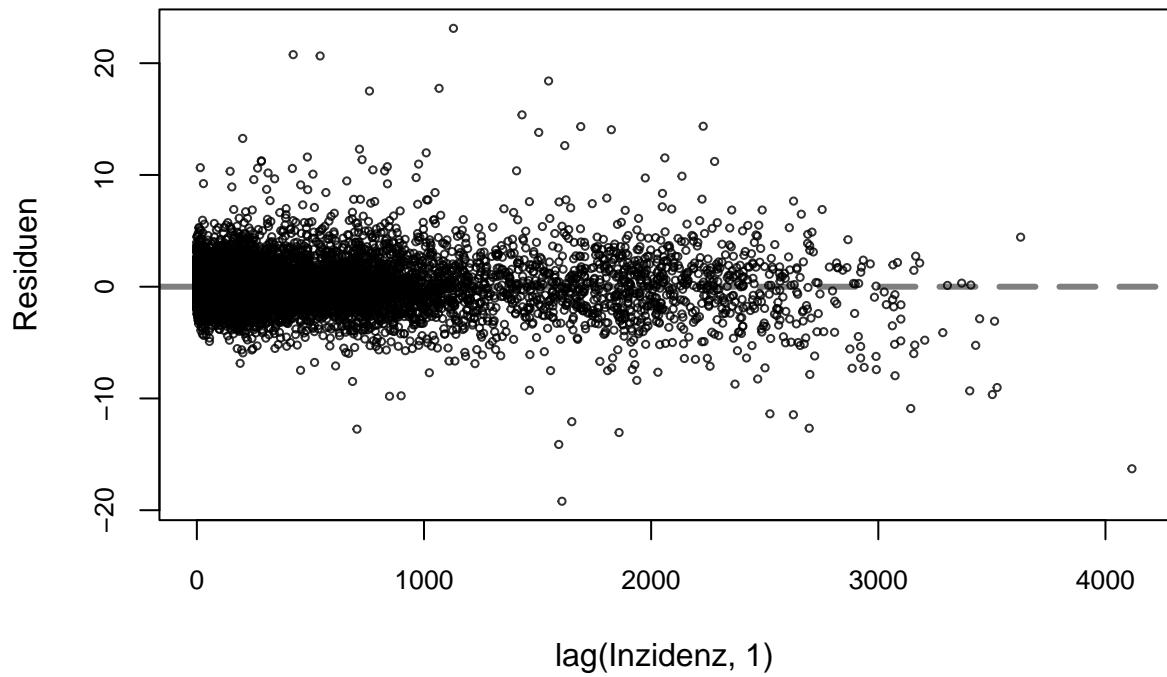
```
## integer(0)
```



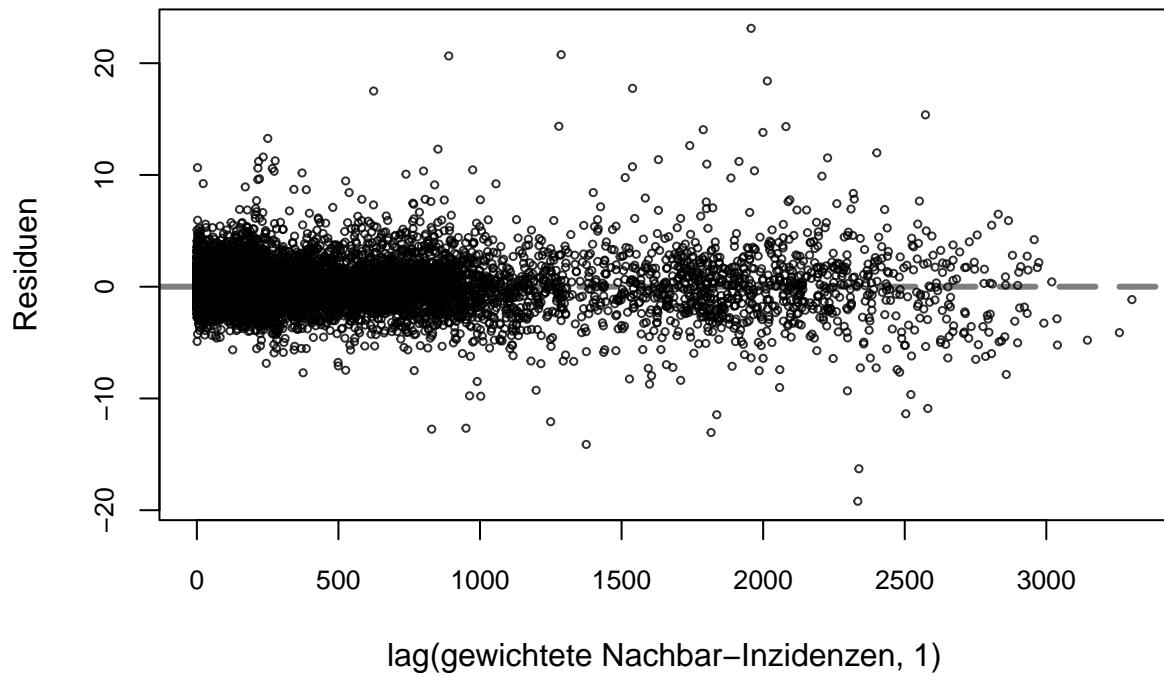
```
## integer(0)
```



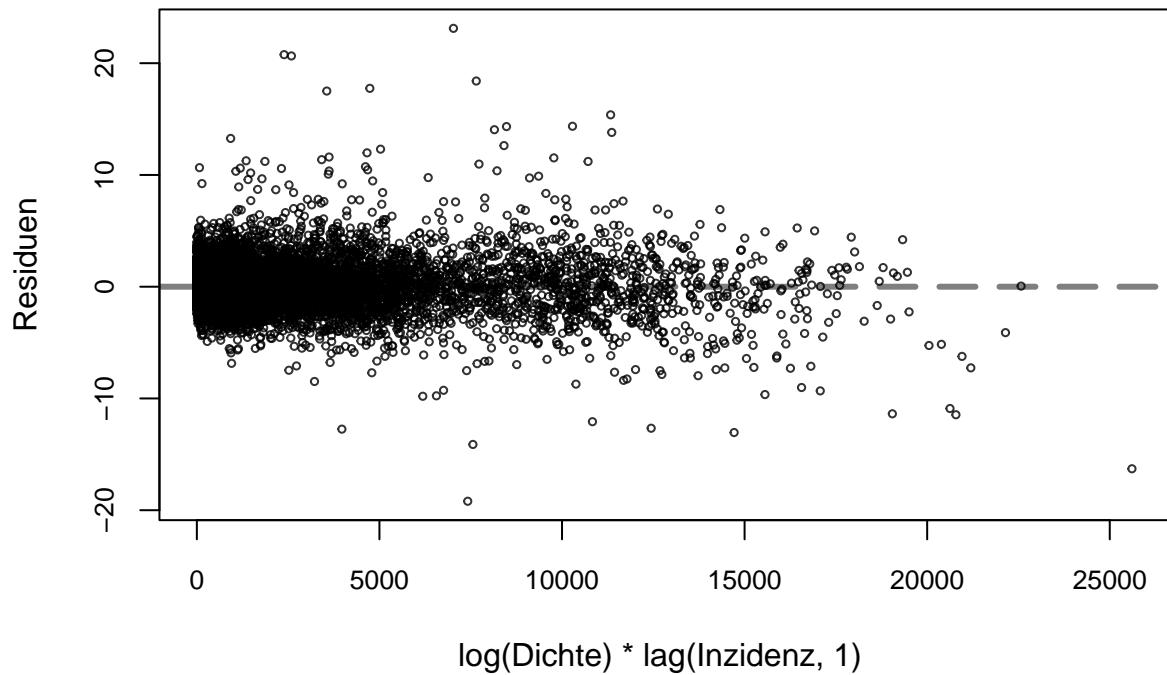
```
## integer(0)
```



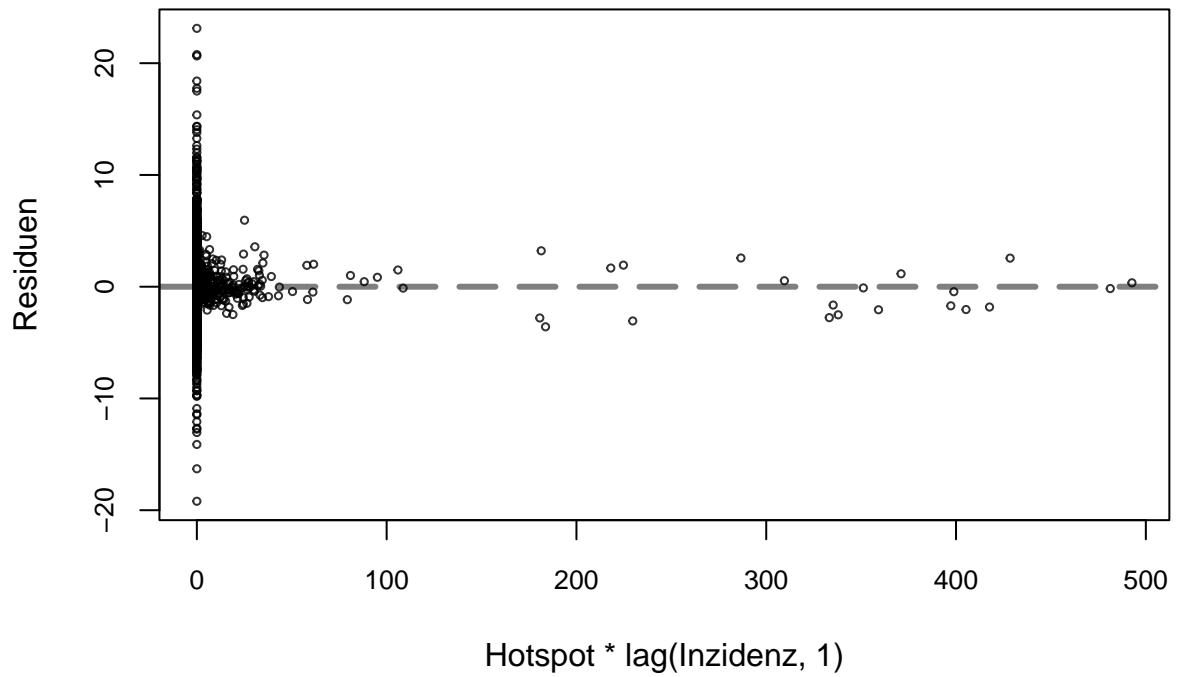
```
## integer(0)
```



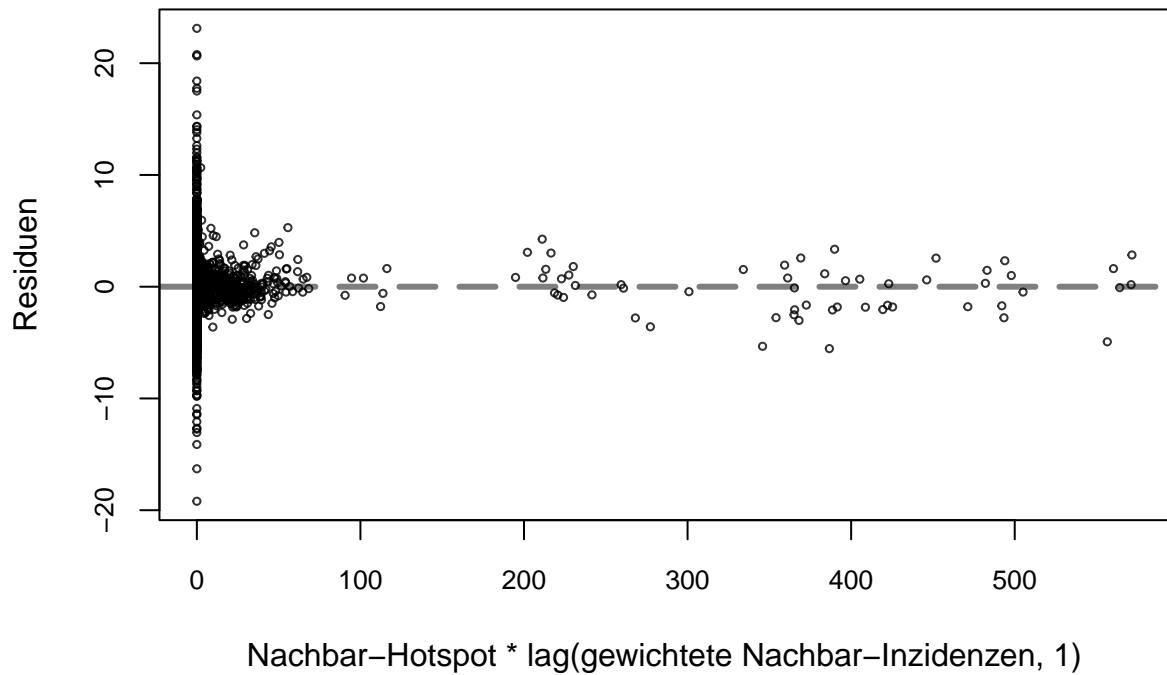
```
## integer(0)
```



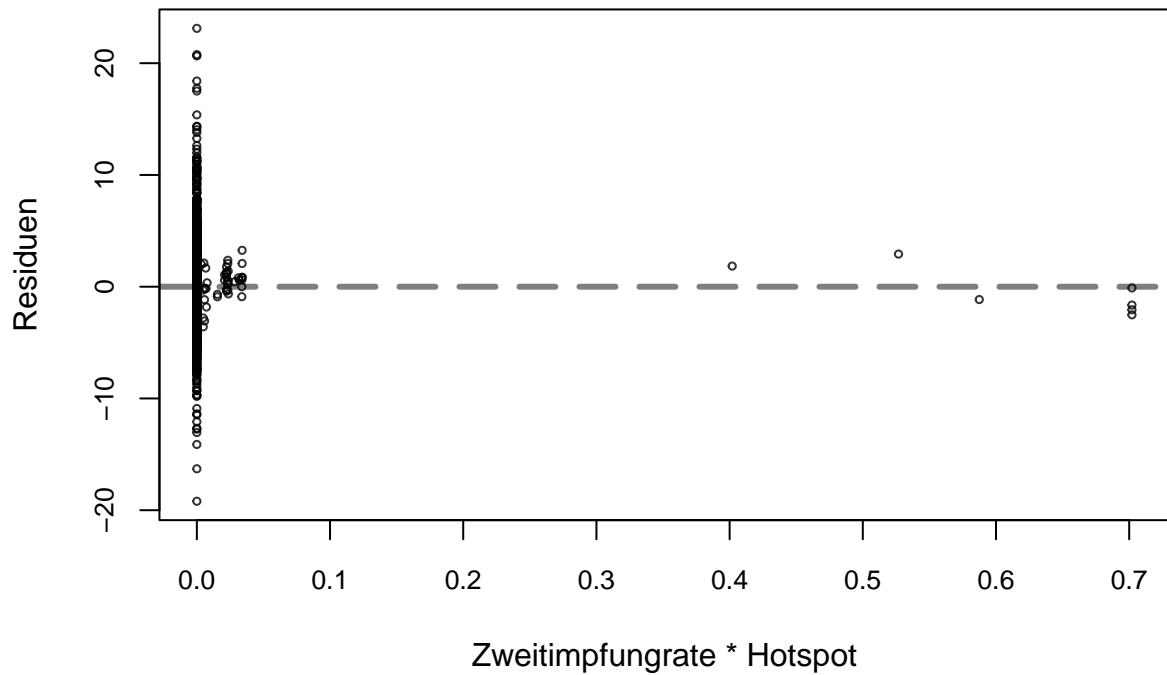
```
## integer(0)
```



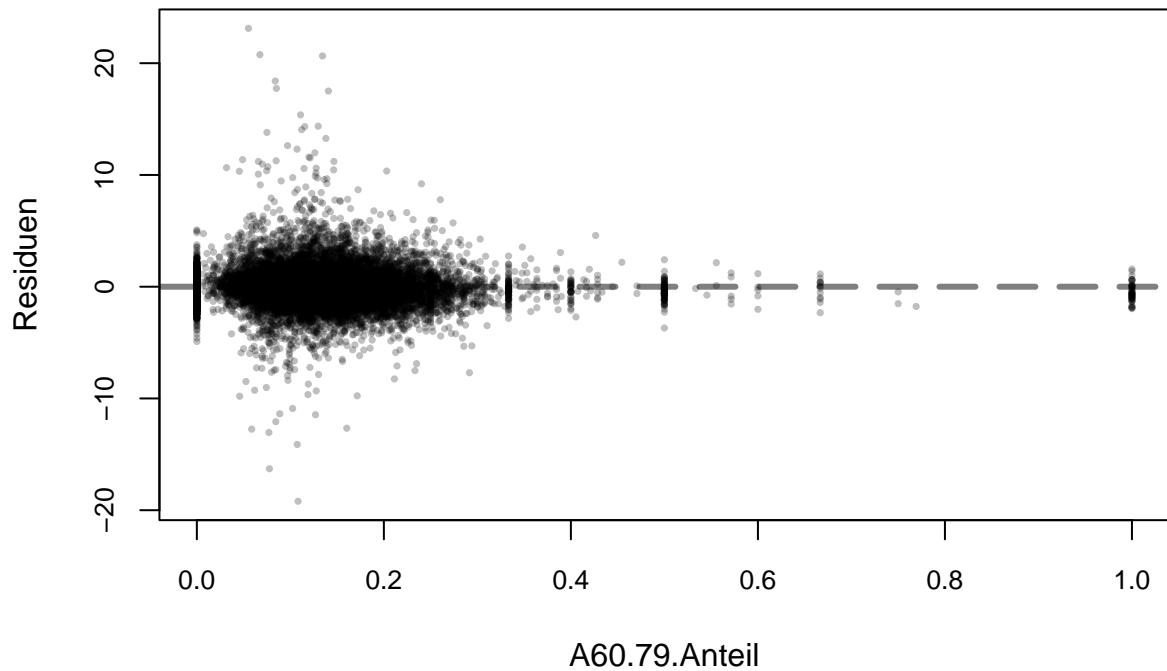
```
## integer(0)
```



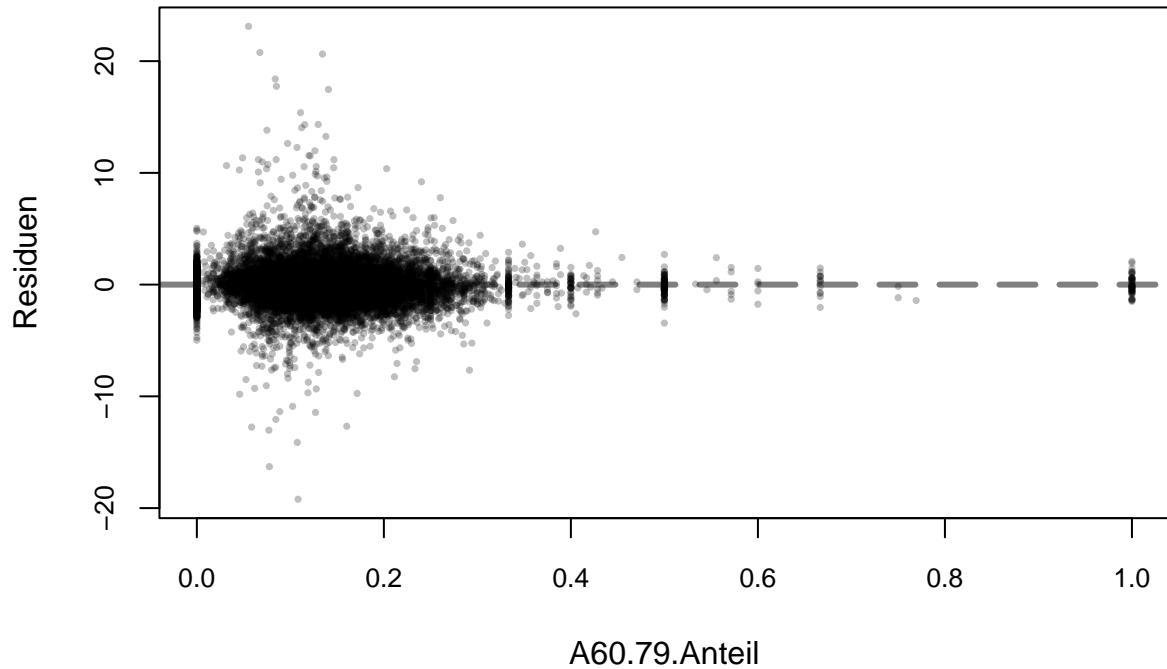
```
## integer(0)
```



```
## integer(0)
```



```
## integer(0)
```



```

## integer(0)

df4 <- df4 %>%
  mutate(Kalenderwoche = df4$week+3)

p<-c(1:9)
nullt<-subset(df4, df4$Kalenderwoche%in%p)

p<-c(9:20)
erst<-subset(df4,df4$Kalenderwoche%in%p)

p<-c(20:39)
zweit<-subset(df4,df4$Kalenderwoche%in%p)

p<-c(39:(52+8))
dritt<-subset(df4,df4$Kalenderwoche%in%p)

p<-c((52+9-1):(52+23))
viert<-subset(df4,df4$Kalenderwoche%in%p)

p<-c((52+24-1):(52+30))
fünft<-subset(df4,df4$Kalenderwoche%in%p)

p<-c((52+31-1):(52+51))

```

```

sechst<-subset(df4,df4$Kalendarwoche%in%p)

p<-c((52+52-1):(52+151))
siebt<-subset(df4,df4$Kalendarwoche%in%p)

p<-c(20:30)
zweit_a<-subset(df4,df4$Kalendarwoche%in%p)

p<-c(30:39)
zweit_b<-subset(df4,df4$Kalendarwoche%in%p)

p<-c((52+31-1):(52+39))
sechst_a<-subset(df4,df4$Kalendarwoche%in%p)

p<-c((52+40-1):(52+51))
sechst_b<-subset(df4,df4$Kalendarwoche%in%p)

df4_pan <- pdata.frame(df4, index = c("district", "week"))

### residual plots fill with alpha = 0.03

nullt_pan<-pdata.frame(nullt,index=c("district","week"))

pool.nullt<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                 + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                 +I(hotspotnb * lag(weightednbins, 1))
                 + A60.79.Anteil
                 + factor(week)
                 , data =nullt_pan, model = "pooling")

pool.nullt.adj<-plm(inzidenz ~ lag(inzidenz, 1)
                     + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                     + A60.79.Anteil + A15.34.Anteil
                     + factor(week)
                     , data =nullt_pan, model = "pooling")
# summary(pool.nullt.adj)
# coeftest(pool.nullt.adj, vcovHC(pool.nullt.adj, type = "HCO"))

nullt_pan<-pdata.frame(nullt,index=c("district","week"))

pool.nullt<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                 + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                 +I(hotspotnb * lag(weightednbins, 1))
                 + A60.79.Anteil
                 + factor(week)
                 , data =nullt_pan, model = "pooling")

summary(pool.nullt)

```

```

## Pooling Model
##
## Call:
## plm(formula = inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz,
##      1) + I(log(density) * lag(inzidenz, 1)) + I(hotspot * lag(inzidenz,
##      1)) + I(hotspotnb * lag(weightednbinz, 1)) + A60.79.Anteil +
##      factor(week), data = nullt_pan, model = "pooling")
##
## Balanced Panel: n = 96, T = 5, N = 480
##
## Residuals:
##      Min.    1st Qu.     Median    3rd Qu.     Max.
## -5.7212089 -0.0385659 -0.0098661  0.0062437 12.2476522
##
## Coefficients:
##                               Estimate Std. Error t-value Pr(>|t|)
## (Intercept)                0.0098661  0.0904924  0.1090 0.9132283
## lag(inzidenz, 1)            5.3474577  1.2275649  4.3562 1.627e-05
## lag(weightednbinz, 1)       0.1286365  0.4084907  0.3149 0.7529725
## I(log(density) * lag(inzidenz, 1)) -0.9066297  0.2097791 -4.3218 1.891e-05
## I(hotspot * lag(inzidenz, 1))    10.1933767  0.7274941 14.0116 < 2.2e-16
## I(hotspotnb * lag(weightednbinz, 1)) 0.8150946  1.0664429  0.7643 0.4450660
## A60.79.Anteil                 1.8874738  0.7977027  2.3661 0.0183804
## factor(week)3                -0.0150087  0.1241213 -0.1209 0.9038063
## factor(week)4                -0.0161097  0.1250727 -0.1288 0.8975689
## factor(week)5                 0.0286998  0.1256038  0.2285 0.8193612
## factor(week)6                 0.4792564  0.1325589  3.6154 0.0003323
##
## (Intercept)
## lag(inzidenz, 1)          ***
## lag(weightednbinz, 1)
## I(log(density) * lag(inzidenz, 1)) ***
## I(hotspot * lag(inzidenz, 1)) ***
## I(hotspotnb * lag(weightednbinz, 1))
## A60.79.Anteil             *
## factor(week)3
## factor(week)4
## factor(week)5
## factor(week)6          ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:  561.04
## Residual Sum of Squares: 346.68
## R-Squared: 0.38208
## Adj. R-Squared: 0.36891
## F-statistic: 28.9998 on 10 and 469 DF, p-value: < 2.22e-16

```

```

erst_pan<-pdata.frame(erst,index=c("district","week"))

pool.erst<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil

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+ factor(week)
, data =erst_pan, model = "pooling")

zweit_pan<-pdata.frame(zweite, index=c("district", "week"))

pool.zweite<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =zweite_pan, model = "pooling")

dritt_pan <-pdata.frame(dritte, index=c("district", "week"))

pool.dritte <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =dritte_pan, model = "pooling")

pool.vierte <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =vierte, model = "pooling", index=c("district", "week"))

pool.fuenfte <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =fünft, model = "pooling", index=c("district", "week"))

pool.sechste <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =sechst, model = "pooling", index=c("district", "week"))

pool.siebte <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =siebt, model = "pooling", index=c("district", "week"))

```

```

pool.zweit.a <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = zweit_a, model = "pooling", index = c("district", "week"))

pool.zweit.b <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = zweit_b, model = "pooling", index = c("district", "week"))

pool.sechst.a <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = sechst_a, model = "pooling", index = c("district", "week"))
pool.sechst.b <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = sechst_b, model = "pooling", index = c("district", "week"))

sum.nullt <- summary(pool.nullt)
sum.erst <- summary(pool.erst)
sum.zweit <- summary(pool.zweit)
sum.dritt <-summary(pool.dritt)
sum.viert <-summary(pool.viert)
sum.fuenft <-summary(pool.fuenft)
sum.sechst <-summary(pool.sechst)
sum.siebt <-summary(pool.siebt)
sum.zweit.a <-summary(pool.zweit.a)
sum.zweit.b <-summary(pool.zweit.b)
sum.sechst.a <-summary(pool.sechst.a)
sum.sechst.b <-summary(pool.sechst.b)

pooled_r_squared<-c(nullte=sum.nullt$r.squared[2],
erste=sum.erst$r.squared[2],
zweite=sum.zweit$r.squared[2],
dritte=sum.dritt$r.squared[2],
vierte=sum.viert$r.squared[2],
fuenfte=sum.fuenft$r.squared[2],
sechste=sum.sechst$r.squared[2],
siebte=sum.siebt$r.squared[2],
zweite_a=sum.zweit.a$r.squared[2],

```

```

zweite_b=sum.zweit.b$r.squared[2] ,
sechste_a=sum.sechst.a$r.squared[2] ,
sechste_b=sum.sechst.b$r.squared[2]

pool.sqrt.nullt <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =nullt, model = "pooling", index = c("district", "week"))

pool.sqrt.erst <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =erst, model = "pooling", index = c("district", "week"))

pool.sqrt.zweit <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =zweit, model = "pooling", index = c("district", "week"))

pool.sqrt.dritt <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =dritt, model = "pooling", index = c("district", "week"))

pool.sqrt.viert <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =viert, model = "pooling", index = c("district", "week"))

pool.sqrt.fuenft <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =fünft, model = "pooling", index = c("district", "week"))

pool.sqrt.sechst <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =sechst, model = "pooling", index = c("district", "week"))

pool.sqrt.siebt <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
+ sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
+ sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
+ sqrt(A60.79.Anteil)
+ factor(week)
, data =siebt, model = "pooling", index = c("district", "week"))

```

```

pool.sqrt.zweit.a <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
                           + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
                           + sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
                           + sqrt(A60.79.Anteil)
                           + factor(week)
                           , data = zweit_a, model = "pooling", index = c("district", "week"))
pool.sqrt.zweit.b <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
                           + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
                           + sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
                           + sqrt(A60.79.Anteil)
                           + factor(week)
                           , data = zweit_b, model = "pooling", index = c("district", "week"))
pool.sqrt.sechst.a <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
                           + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
                           + sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
                           + sqrt(A60.79.Anteil)
                           + factor(week)
                           , data = sechst_a, model = "pooling", index = c("district", "week"))
pool.sqrt.sechst.b <- plm(sqrt(inzidenz) ~ sqrt(lag(inzidenz, 1)) + sqrt(lag(weightednbinz, 1))
                           + sqrt(I(log(density)*lag(inzidenz, 1))) + sqrt(I(hotspot * lag(inzidenz, 1)))
                           + sqrt(I(hotspotnb * lag(weightednbinz, 1))) + sqrt(I(rate_zweitimpf * hotspot))
                           + sqrt(A60.79.Anteil)
                           + factor(week)
                           , data = sechst_b, model = "pooling", index = c("district", "week"))

```

```

sum.sqrt.nullt <- summary(pool.sqrt.nullt)
sum.sqrt.erst <- summary(pool.sqrt.erst)
sum.sqrt.zweit <- summary(pool.sqrt.zweit)
sum.sqrt.dritt <-summary(pool.sqrt.dritt)
sum.sqrt.viert <-summary(pool.sqrt.viert)
sum.sqrt.fuenft <-summary(pool.sqrt.fuenft)
sum.sqrt.sechst <-summary(pool.sqrt.sechst)
sum.sqrt.siebt <-summary(pool.sqrt.siebt)
sum.sqrt.zweit.a <-summary(pool.sqrt.zweit.a)
sum.sqrt.zweit.b <-summary(pool.sqrt.zweit.b)
sum.sqrt.sechst.a <-summary(pool.sqrt.sechst.a)
sum.sqrt.sechst.b <-summary(pool.sqrt.sechst.b)

sqrt_r_squared<-c(nullte=sum.sqrt.nullt$r.squared[2],
erste=sum.sqrt.erst$r.squared[2],
zweite=sum.sqrt.zweit$r.squared[2],
dritte=sum.sqrt.dritt$r.squared[2],
vierte=sum.sqrt.viert$r.squared[2],
fuenfte=sum.sqrt.fuenft$r.squared[2],
sechste=sum.sqrt.sechst$r.squared[2],
siebte=sum.sqrt.siebt$r.squared[2],
zweite_a=sum.sqrt.zweit.a$r.squared[2],
zweite_b=sum.sqrt.zweit.b$r.squared[2],
sechste_a=sum.sqrt.sechst.a$r.squared[2],
sechste_b=sum.sqrt.sechst.b$r.squared[2])

```

```

nullt_pan<-pdata.frame(nullt,index=c("district","week"))

pool.weighted.nullt<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1))
                           + A60.79.Anteil
                           + factor(week)
                           , data =nullt_pan, model = "pooling", weights = 1/(sqrt(inzidenz) +1))

erst_pan<-pdata.frame(erst,index=c("district","week"))

pool.weighted.erst<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
                           + A60.79.Anteil
                           + factor(week)
                           , data =erst_pan, model = "pooling", weights = 1/(sqrt(inzidenz) +1))

zweit_pan<-pdata.frame(zweit,index=c("district","week"))

pool.weighted.zweit<-plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
                           + A60.79.Anteil
                           + factor(week)
                           , data =zweit_pan, model = "pooling", weights = 1/(sqrt(inzidenz) +1))

dritt_pan <-pdata.frame(dritt,index=c("district","week"))

pool.weighted.dritt <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
                           + A60.79.Anteil
                           + factor(week)
                           , data =dritt_pan, model = "pooling", weights = 1/(sqrt(inzidenz) +1))

pool.weighted.viert <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
                           + A60.79.Anteil
                           + factor(week)
                           , data =viert, model = "pooling", weights = 1/(sqrt(inzidenz) +1),index=c("d

pool.weighted.fuenft <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbins, 1)
                           + I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
                           +I(hotspotnb * lag(weightednbins, 1)) + I(rate_zweitimpf * hotspot)
                           + A60.79.Anteil
                           + factor(week)

```

```

        , data =fünft, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100))

pool.weighted.schst <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =schst, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

pool.weighted.siebt <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data =siebt, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

pool.weighted.zweit.a <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = zweit_a, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

pool.weighted.zweit.b <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = zweit_b, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

pool.weighted.schst.a <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = schst_a, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

pool.weighted.schst.b <- plm(inzidenz ~ lag(inzidenz, 1) + lag(weightednbinz, 1)
+ I(log(density)*lag(inzidenz, 1)) + I(hotspot * lag(inzidenz, 1))
+I(hotspotnb * lag(weightednbinz, 1)) + I(rate_zweitimpf * hotspot)
+ A60.79.Anteil
+ factor(week)
, data = schst_b, model = "pooling", weights = 1/(sqrt(inzidenz) +1), index=c(1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,50,61,62,63,64,65,66,67,68,69,60,71,72,73,74,75,76,77,78,79,70,81,82,83,84,85,86,87,88,89,80,91,92,93,94,95,96,97,98,99,100))

sum.weighted.nullt <- summary(pool.weighted.nullt)
sum.weighted.erst <- summary(pool.weighted.erst)
sum.weighted.zweit <- summary(pool.weighted.zweit)
sum.weighted.dritt <-summary(pool.weighted.dritt)
sum.weighted.viert <-summary(pool.weighted.viert)
sum.weighted.fuenft <-summary(pool.weighted.fuenft)
sum.weighted.sechst <-summary(pool.weighted.sechst)
```

```

sum.weighted.siebt <-summary(pool.weighted.siebt)
sum.weighted.zweit.a <-summary(pool.weighted.zweit.a)
sum.weighted.zweit.b <-summary(pool.weighted.zweit.b)
sum.weighted.sechst.a <-summary(pool.weighted.sechst.a)
sum.weighted.sechst.b <-summary(pool.weighted.sechst.b)

weighted_r_squared<-c(nullte=sum.weighted.nullt$r.squared[2],
erste=sum.weighted.erst$r.squared[2],
zweite=sum.weighted.zweit$r.squared[2],
dritte=sum.weighted.dritt$r.squared[2],
vierte=sum.weighted.viert$r.squared[2],
fuenfte=sum.weighted.fuenft$r.squared[2],
sechste=sum.weighted.sechst$r.squared[2],
siebte=sum.weighted.siebt$r.squared[2],
zweite_a=sum.weighted.zweit.a$r.squared[2],
zweite_b=sum.weighted.zweit.b$r.squared[2],
sechste_a=sum.weighted.sechst.a$r.squared[2],
sechste_b=sum.weighted.sechst.b$r.squared[2])

r_squares<-cbind(weighted=weighted_r_squared,squareroot=sqrt_r_squared,pooled=pooled_r_squared)

r_squares

##          weighted squareroot     pooled
## nullte.adjrsq 0.3588934 0.4413429 0.3689052
## erste.adjrsq  0.7955422 0.8265020 0.7977094
## zweite.adjrsq 0.5234788 0.6426724 0.5353590
## dritte.adjrsq 0.7689818 0.8209038 0.7691873
## vierte.adjrsq 0.8384333 0.8793703 0.8388131
## fuenfte.adjrsq 0.3728975 0.4170231 0.3802326
## sechste.adjrsq 0.9328462 0.9552067 0.9332220
## siebte.adjrsq 0.9285577 0.9492431 0.9287879
## zweite_a.adjrsq 0.2824139 0.3478480 0.2980507
## zweite_b.adjrsq 0.5041264 0.5386395 0.5093895
## sechste_a.adjrsq 0.7649306 0.7971482 0.7657254
## sechste_b.adjrsq 0.8939051 0.9251365 0.8944070

```