Clusters jerárquicos en series de tiempo

Christian Castro

08-05-2020

## R

## -- Attaching packages ------------------------- tidyverse 1.3.0 --

## v ggplot2 3.3.0 v purrr 0.3.4  
## v tibble 3.0.1 v dplyr 0.8.5  
## v tidyr 1.0.2 v stringr 1.4.0  
## v readr 1.3.1 v forcats 0.5.0

## -- Conflicts ---------------------------- tidyverse\_conflicts() --  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

##   
## Attaching package: 'magrittr'

## The following object is masked from 'package:purrr':  
##   
## set\_names

## The following object is masked from 'package:tidyr':  
##   
## extract

## Using ',' as decimal and '.' as grouping mark. Use read\_delim() for more control.

## Parsed with column specification:  
## cols(  
## Comuna = col\_character(),  
## Casos\_Acumulados = col\_double(),  
## Fecha = col\_double()  
## )

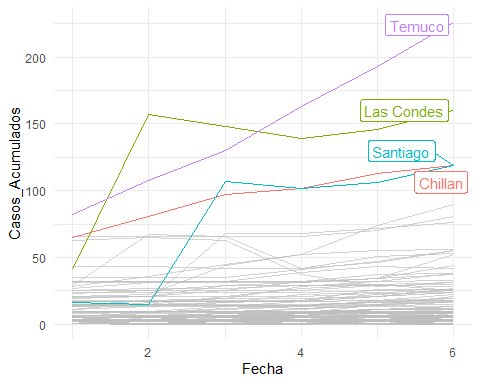
## # A tibble: 10 x 3  
## Comuna Casos\_Acumulados Fecha  
## <chr> <dbl> <dbl>  
## 1 Aisen 1 1  
## 2 Algarrobo NA NA  
## 3 Alto Hospicio 1 1  
## 4 Ancud NA NA  
## 5 Andacollo NA NA  
## 6 Angol 9 1  
## 7 Antofagasta 20 1  
## 8 Arauco 4 1  
## 9 Arica 3 1  
## 10 Buin 2 1

## tibble [1,632 x 3] (S3: spec\_tbl\_df/tbl\_df/tbl/data.frame)  
## $ Comuna : chr [1:1632] "Aisen" "Algarrobo" "Alto Hospicio" "Ancud" ...  
## $ Casos\_Acumulados: num [1:1632] 1 NA 1 NA NA 9 20 4 3 2 ...  
## $ Fecha : num [1:1632] 1 NA 1 NA NA 1 1 1 1 1 ...  
## - attr(\*, "spec")=  
## .. cols(  
## .. Comuna = col\_character(),  
## .. Casos\_Acumulados = col\_double(),  
## .. Fecha = col\_double()  
## .. )

## Comuna Casos\_Acumulados Fecha   
## Length:1632 Min. : 0.00 Min. :1.000   
## Class :character 1st Qu.: 1.00 1st Qu.:2.000   
## Mode :character Median : 4.00 Median :4.000   
## Mean : 12.13 Mean :3.666   
## 3rd Qu.: 13.00 3rd Qu.:5.000   
## Max. :226.00 Max. :6.000   
## NA's :714 NA's :714

## label\_key: Comuna

## Warning: Removed 714 row(s) containing missing values (geom\_path).



## Rows: 918  
## Columns: 3  
## $ Casos\_Acumulados <dbl> 1, 1, 9, 20, 4, 3, 2, 5, 4, 2, 2, 3, 1, 2, 1, 1, 1...  
## $ Fecha <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,...  
## $ Comuna <chr> "Aisen", "Alto Hospicio", "Angol", "Antofagasta", ...

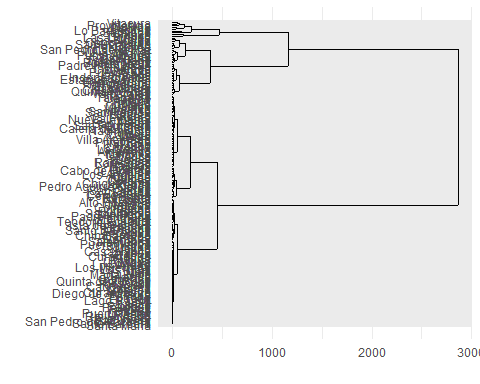
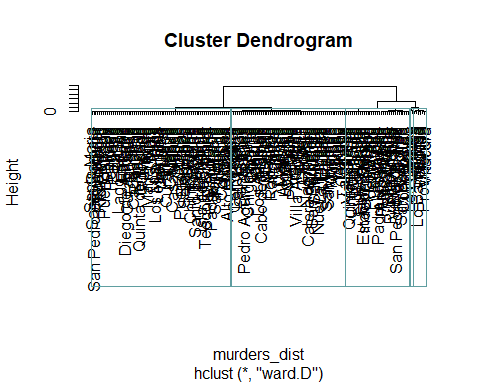
## Rows: 6  
## Columns: 174  
## $ Fecha <dbl> 1, 2, 3, 4, 5, 6  
## $ Aisen <dbl> 1, 0, 0, 0, 0, 0  
## $ Algarrobo <dbl> NA, NA, 5, 5, 7, 7  
## $ `Alto Hospicio` <dbl> 1, 1, 1, 1, 3, 3  
## $ Angol <dbl> 9, 10, 13, 17, 18, 18  
## $ Antofagasta <dbl> 20, 21, 25, 32, 32, 33  
## $ Arauco <dbl> 4, 4, 6, 6, 6, 6  
## $ Arica <dbl> 3, 3, 3, 4, 5, 5  
## $ Buin <dbl> 2, 2, 5, 5, 8, 8  
## $ Bulnes <dbl> 5, 5, 5, 7, 11, 13  
## $ `Cabo de Hornos` <dbl> 4, 4, 4, 8, 8, 9  
## $ Cabrero <dbl> 2, 2, 4, 4, 4, 4  
## $ Calama <dbl> 2, 1, 1, 1, 1, 1  
## $ Calbuco <dbl> 3, 4, 4, 4, 4, 5  
## $ Calera <dbl> 1, 5, 5, 5, 5, 5  
## $ `Calera de Tango` <dbl> 2, 2, 2, 2, 3, 3  
## $ Carahue <dbl> 1, 1, 1, 1, 1, 1  
## $ Casablanca <dbl> 1, 1, 1, 1, 1, 1  
## $ Castro <dbl> 1, 1, 1, 1, 1, 1  
## $ Cauquenes <dbl> NA, NA, 1, 1, 1, 1  
## $ Cerrillos <dbl> 2, 2, 2, 2, 4, 5  
## $ `Cerro Navia` <dbl> 9, 9, 9, 9, 10, 10  
## $ Chiguayante <dbl> 7, 7, 8, 10, 11, 13  
## $ Chillan <dbl> 65, 81, 97, 102, 113, 119  
## $ `Chillan Viejo` <dbl> 14, 18, 19, 19, 21, 24  
## $ Chimbarongo <dbl> 1, 1, 2, 2, 2, 2  
## $ Coihaique <dbl> 1, 1, 1, 1, 2, 2  
## $ Colbun <dbl> 1, 1, 1, 2, 2, 1  
## $ Colina <dbl> 32, 32, 32, 32, 34, 37  
## $ Concepcion <dbl> 28, 36, 45, 52, 55, 56  
## $ Conchali <dbl> 14, 14, 14, 14, 17, 18  
## $ Concon <dbl> NA, NA, NA, NA, NA, 1  
## $ Copiapo <dbl> 1, 0, 0, 0, 2, 2  
## $ Coquimbo <dbl> 10, 10, 10, 11, 15, 16  
## $ Coronel <dbl> 6, 6, 8, 9, 11, 11  
## $ Curacavi <dbl> 5, 5, 5, 5, 5, 5  
## $ Curanilahue <dbl> NA, NA, 1, 1, 1, 1  
## $ Curarrehue <dbl> 1, 1, 1, 1, 1, 1  
## $ Curico <dbl> 3, 3, 3, 3, 4, 6  
## $ `Diego de Almagro` <dbl> NA, NA, NA, 1, 1, 1  
## $ `El Bosque` <dbl> 18, 18, 18, 18, 22, 25  
## $ `El Monte` <dbl> 2, 2, 2, 2, 2, 2  
## $ `El Tabo` <dbl> NA, NA, NA, NA, 1, 1  
## $ `Estacion Central` <dbl> 15, 15, 14, 12, 14, 15  
## $ Florida <dbl> 1, 1, 1, 1, 1, 1  
## $ Frutillar <dbl> 1, 1, 1, 1, 1, 1  
## $ Futrono <dbl> NA, 1, 1, 1, 1, 1  
## $ Gorbea <dbl> 3, 3, 4, 5, 6, 7  
## $ Hualaihue <dbl> NA, NA, NA, NA, 1, 3  
## $ Hualpen <dbl> 6, 9, 11, 13, 14, 17  
## $ Hualqui <dbl> 3, 3, 3, 4, 4, 4  
## $ Huechuraba <dbl> 17, 17, 17, 17, 18, 19  
## $ Independencia <dbl> 15, 15, 15, 15, 16, 17  
## $ Iquique <dbl> 4, 7, 7, 9, 9, 9  
## $ `Isla de Pascua` <dbl> 2, 2, 2, 2, 2, 2  
## $ `La Cisterna` <dbl> 10, 10, 10, 10, 10, 10  
## $ `La Cruz` <dbl> NA, NA, NA, NA, NA, 1  
## $ `La Florida` <dbl> 43, 43, 42, 42, 46, 55  
## $ `La Granja` <dbl> 5, 5, 5, 5, 6, 7  
## $ `La Ligua` <dbl> 1, 1, 1, 1, 1, 1  
## $ `La Pintana` <dbl> 1, 1, 1, 1, 7, 10  
## $ `La Reina` <dbl> 24, 24, 24, 24, 25, 26  
## $ `La Serena` <dbl> NA, NA, NA, NA, 2, 2  
## $ `La Union` <dbl> 4, 4, 6, 7, 8, 10  
## $ `Lago Ranco` <dbl> NA, 1, 1, 1, 1, 1  
## $ Laja <dbl> NA, NA, NA, 1, 1, 1  
## $ Lampa <dbl> 10, 10, 10, 10, 10, 10  
## $ Lanco <dbl> NA, NA, NA, NA, NA, 1  
## $ `Las Condes` <dbl> 41, 157, 148, 139, 146, 160  
## $ Lautaro <dbl> NA, NA, NA, 1, 3, 8  
## $ Limache <dbl> 2, 2, 2, 2, 2, 2  
## $ Linares <dbl> 1, 1, 1, 2, 3, 5  
## $ `Lo Barnechea` <dbl> NA, 18, 68, 68, 72, 76  
## $ `Lo Espejo` <dbl> 4, 4, 4, 4, 5, 6  
## $ `Lo Prado` <dbl> 14, 14, 14, 14, 15, 17  
## $ Longavi <dbl> 1, 1, 1, 1, 1, 1  
## $ `Los Andes` <dbl> 1, 1, 1, 1, 1, 1  
## $ `Los Angeles` <dbl> 3, 3, 3, 9, 10, 10  
## $ `Los Muermos` <dbl> 1, 1, 1, 1, 1, 1  
## $ `Los Vilos` <dbl> 1, 1, 1, 1, 1, 1  
## $ Lota <dbl> 1, 1, 1, 1, 1, 1  
## $ Machali <dbl> 2, 4, 6, 6, 6, 5  
## $ Macul <dbl> 4, 4, 4, 4, 7, 9  
## $ Mafil <dbl> 1, 1, 1, 1, 1, 1  
## $ Maipu <dbl> 35, 35, 35, 41, 47, 55  
## $ `Maria Pinto` <dbl> 1, 1, 1, 1, 1, 1  
## $ Mariquina <dbl> NA, NA, NA, 1, 1, 2  
## $ Maule <dbl> NA, 2, 3, 3, 3, 3  
## $ Melipilla <dbl> 5, 6, 6, 6, 7, 8  
## $ Molina <dbl> NA, NA, NA, NA, 0, 1  
## $ Mulchen <dbl> 1, 1, 1, 5, 5, 5  
## $ Nacimiento <dbl> 3, 3, 3, 4, 4, 3  
## $ Natales <dbl> NA, NA, 1, 1, 2, 2  
## $ `Nueva Imperial` <dbl> 2, 2, 3, 3, 3, 2  
## $ NuNoa <dbl> 66, 66, 66, 66, 70, 81  
## $ Osorno <dbl> 21, 22, 44, 52, 74, 90  
## $ Ovalle <dbl> 1, 1, 2, 3, 4, 4  
## $ `Padre Hurtado` <dbl> 1, 1, 1, 1, 1, 2  
## $ `Padre las Casas` <dbl> 8, 9, 12, 14, 16, 19  
## $ Paillaco <dbl> NA, NA, NA, NA, NA, 1  
## $ Paine <dbl> 1, 1, 2, 2, 2, 2  
## $ Parral <dbl> NA, NA, NA, 1, 2, 3  
## $ `Pedro Aguirre Cerda` <dbl> 7, 7, 7, 7, 11, 12  
## $ Pelluhue <dbl> NA, NA, 1, 1, 1, 1  
## $ PeNaflor <dbl> 10, 10, 10, 10, 11, 12  
## $ PeNalolen <dbl> 31, 31, 31, 31, 34, 44  
## $ Petorca <dbl> NA, NA, NA, 1, 1, 1  
## $ Pirque <dbl> NA, NA, 1, 1, 1, 1  
## $ Pitrufquen <dbl> 1, 2, 3, 5, 6, 7  
## $ Placilla <dbl> 1, 1, 1, 1, 1, 1  
## $ Providencia <dbl> 29, 67, 66, 42, 51, 53  
## $ Pucon <dbl> 1, 1, 1, 1, 2, 2  
## $ Pudahuel <dbl> 17, 17, 17, 17, 21, 24  
## $ `Puente Alto` <dbl> 5, 6, 6, 8, 15, 21  
## $ `Puerto Montt` <dbl> 25, 27, 27, 29, 29, 28  
## $ `Puerto Octay` <dbl> NA, NA, NA, 1, 1, 1  
## $ `Puerto Varas` <dbl> 1, 1, 1, 1, 1, 0  
## $ `Punta Arenas` <dbl> 19, 21, 29, 31, 34, 52  
## $ Putaendo <dbl> 1, 1, 1, 1, 2, 2  
## $ Puyehue <dbl> 1, 1, 1, 1, 1, 1  
## $ Quilicura <dbl> 17, 17, 17, 17, 21, 27  
## $ Quillon <dbl> 4, 6, 7, 9, 9, 9  
## $ Quillota <dbl> 5, 5, 5, 8, 9, 8  
## $ Quilpue <dbl> 4, 6, 8, 8, 9, 9  
## $ Quinchao <dbl> 1, 1, 1, 1, 1, 1  
## $ `Quinta de Tilcoco` <dbl> 1, 1, 1, 1, 1, 1  
## $ `Quinta Normal` <dbl> 21, 21, 21, 21, 23, 24  
## $ Quintero <dbl> 1, 2, 2, 3, 3, 3  
## $ Rancagua <dbl> 3, 4, 4, 5, 5, 6  
## $ Ranquil <dbl> 1, 1, 1, 1, 1, 1  
## $ Recoleta <dbl> 10, 10, 10, 7, 9, 11  
## $ Renca <dbl> 7, 7, 7, 8, 11, 11  
## $ Rengo <dbl> NA, NA, NA, NA, NA, 1  
## $ Requinoa <dbl> 1, 1, 1, 1, 1, 0  
## $ `Rio Claro` <dbl> 1, 1, 1, 1, 1, 1  
## $ `Rio Hurtado` <dbl> NA, 1, 1, 1, 1, 1  
## $ `Rio Negro` <dbl> NA, NA, 1, 1, 1, 1  
## $ Romeral <dbl> NA, NA, 2, 2, 2, 2  
## $ Salamanca <dbl> 1, 1, 2, 2, 2, 2  
## $ `San Antonio` <dbl> 1, 1, 1, 1, 2, 2  
## $ `San Bernardo` <dbl> 32, 32, 32, 32, 37, 38  
## $ `San Carlos` <dbl> 6, 8, 9, 12, 13, 13  
## $ `San Fabian` <dbl> NA, NA, 1, 2, 3, 4  
## $ `San Felipe` <dbl> 1, 3, 3, 3, 3, 3  
## $ `San Fernando` <dbl> 3, 3, 3, 3, 3, 3  
## $ `San Javier` <dbl> NA, NA, NA, NA, NA, 1  
## $ `San Joaquin` <dbl> 13, 13, 13, 13, 18, 22  
## $ `San Miguel` <dbl> 25, 25, 25, 25, 29, 30  
## $ `San Pablo` <dbl> NA, 1, 1, 1, 2, 2  
## $ `San Pedro de Atacama` <dbl> NA, NA, NA, 1, 1, 1  
## $ `San Pedro de la Paz` <dbl> 27, 31, 32, 39, 43, 42  
## $ `San Ramon` <dbl> NA, NA, NA, NA, 3, 5  
## $ `Santa Barbara` <dbl> NA, NA, NA, 1, 1, 1  
## $ `Santa Maria` <dbl> NA, NA, NA, 1, 1, 1  
## $ Santiago <dbl> 16, 15, 107, 102, 106, 119  
## $ `Santo Domingo` <dbl> 2, 2, 2, 2, 2, 2  
## $ Talagante <dbl> 2, 2, 2, 2, 4, 6  
## $ Talca <dbl> 15, 15, 16, 18, 26, 26  
## $ Talcahuano <dbl> 23, 25, 29, 29, 30, 25  
## $ Taltal <dbl> NA, NA, NA, NA, 1, 2  
## $ Temuco <dbl> 82, 108, 130, 163, 193, 226  
## $ `Teodoro Schmidt` <dbl> NA, NA, NA, NA, 1, 2  
## $ Tocopilla <dbl> 2, 2, 2, 2, 2, 2  
## $ Tome <dbl> 3, 4, 6, 7, 7, 7  
## $ Valdivia <dbl> 11, 16, 19, 28, 32, 38  
## $ Valparaiso <dbl> 11, 13, 16, 22, 24, 25  
## $ Victoria <dbl> NA, 1, 2, 3, 4, 5  
## $ Vilcun <dbl> NA, 1, 2, 4, 4, 5  
## $ `Villa Alemana` <dbl> 2, 3, 3, 5, 6, 7  
## $ Villarrica <dbl> NA, NA, NA, NA, 2, 4  
## $ `ViNa del Mar` <dbl> 13, 15, 21, 27, 30, 31  
## $ Vitacura <dbl> 63, 65, 63, 37, 28, 31  
## $ Yumbel <dbl> 3, 4, 4, 5, 5, 5  
## $ Yungay <dbl> NA, NA, 2, 3, 5, 7

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## Warning in axis(2, at = pretty(range(height)), ...): font family not found in  
## Windows font database  
  
## Warning in axis(2, at = pretty(range(height)), ...): font family not found in  
## Windows font database  
  
## Warning in axis(2, at = pretty(range(height)), ...): font family not found in  
## Windows font database

## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...): font  
## family not found in Windows font database  
  
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...): font  
## family not found in Windows font database  
  
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...): font  
## family not found in Windows font database



## Rows: 173  
## Columns: 2  
## $ Var1 <fct> Aisen, Algarrobo, Alto Hospicio, Angol, Antofagasta, Arauco, A...  
## $ Freq <int> 1, 2, 1, 3, 3, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 1, 1, 1, 1, 2, 2,...

## Rows: 1,038  
## Columns: 4  
## $ Comuna <chr> "Aisen", "Algarrobo", "Alto Hospicio", "Angol", "A...  
## $ Casos\_Acumulados <dbl> 1, NA, 1, 9, 20, 4, 3, 2, 5, 4, 2, 2, 3, 1, 2, 1, ...  
## $ Fecha <dbl> 1, NA, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1...  
## $ cluster <int> 1, 2, 1, 3, 3, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 1, 1,...

##   
## 1 2 3 4 5   
## 72 59 33 7 2

## `geom\_smooth()` using method = 'loess' and formula 'y ~ x'

## Warning: Removed 20 rows containing non-finite values (stat\_smooth).

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : span too small. fewer data values than degrees of freedom.

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : pseudoinverse used at 2.985

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : neighborhood radius 2.015

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : reciprocal condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : There are other near singularities as well. 4.0602

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : Chernobyl! trL>n 6  
  
## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : Chernobyl! trL>n 6

## Warning in sqrt(sum.squares/one.delta): Se han producido NaNs

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
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## parametric, : pseudoinverse used at 3.99

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : neighborhood radius 1.01

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : reciprocal condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : There are other near singularities as well. 1.0201

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
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## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : pseudoinverse used at 2.985

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : neighborhood radius 2.015

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : reciprocal condition number 0

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : There are other near singularities as well. 4.0602

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : Chernobyl! trL>n 6  
  
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## parametric, : at 4.995

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : radius 2.5e-005

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : all data on boundary of neighborhood. make span bigger

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : pseudoinverse used at 4.995

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : neighborhood radius 0.005

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : reciprocal condition number 1

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : at 6.005

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : radius 2.5e-005

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : all data on boundary of neighborhood. make span bigger

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : There are other near singularities as well. 2.5e-005

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : zero-width neighborhood. make span bigger  
  
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## Warning: Computation failed in `stat\_smooth()`:  
## NA/NaN/Inf en llamada a una función externa (arg 5)

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =  
## parametric, : Chernobyl! trL>n 6  
  
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## Warning: Removed 2 row(s) containing missing values (geom\_path).

