---
title: "Dynamic Model"
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date: "April 18, 2023"
output:
pdf_document: default
html_document: default

Exploración de los paneles

Importemos los paneles donde un pánel corresponde a los bateadores y, el otro, a los fielderos.

Por otro lado, se mostrarán las dimensiones de cada pánel

```
print("Bateadores: ")
```

```
[1] "Bateadores: "
```

```
print(dim(hitters_panel))
```

```
[1] 570 205
```

```
print("")
```

```
[1] ""
```

```
print("Fildeadores: ")
```

```
[1] "Fildeadores: "
```

```
print(dim(fielders_panel))
```

```
[1] 542 221
```

Como la posición del jugador es un control, necesitaremos pasar de columna categórica a columna numérica.

```
# Convert categorical column to numerical
# Position;
hitters_panel$position_num_t <- as.numeric(factor(hitters_panel$Posicion_t))
fielders_panel$position_num_t <- as.numeric(factor(fielders_panel$Posicion_t))
# Team:
hitters_panel$team_num_t <- as.numeric(factor(hitters_panel$Acronimo_t))
fielders_panel$team_num_t <- as.numeric(factor(fielders_panel$Acronimo_t))
# Free Agent dummy
hitters_panel <- cbind(setNames(data.frame(rep(1, nrow(hitters_panel))), "Agente_t"), hitters_panel)
fielders_panel <- cbind(setNames(data.frame(rep(1, nrow(fielders_panel))), "Agente_t"), fielders_panel)
```

Como adelanto, se descartaron los controles por posición puesto que no son significativos para los modelos y afectan los resultados. Tal vez por el hehco de que los jugadores tienden a rotar de posición en un mismo partido e incluso a lo largo de la temporada. aAgreguemos una columna de 1's que represente la dummy de ser agente libre

```r
# add a column of 1s to the panel data
hitters_panel <- cbind(hitters_panel,
                       fa = rep(1, nrow(hitters_panel)))
fielders_panel <- cbind(fielders_panel,
                        fa = rep(1, nrow(fielders_panel)))
```

Debido a que en las estadísticas descriptivas se observó un shock en el año de la pandemia COVID-19, se obtendrán las estimaciones quitando el año 2020.

Segmentación por grupo

Lo que haremos es dividir los paneles en ciertas categorías. Primero, veamos todas las posiciones en los páneles

```r
print("Bateadores:")
```

```
[1] "Bateadores:"
```

```r
print(unique(hitters_panel$Posicion_t))
```

```
 [1] SP C  CF RF DH 1B 2B SS 3B LF RP OF
Levels: 1B 2B 3B C CF DH LF OF RF RP SP SS
```

```r
print("")
```

```
[1] ""
```

```r
print("Fildeadores:")
```

```
[1] "Fildeadores:"
```

```r
print(unique(fielders_panel$Posicion_t))
```

```
[1] SP    RP    RP/CL RF    SS
Levels: RF RP RP/CL SP SS
```

Arriba se muestran las posiciones de los jugadores en nuestras bases de datos. A pesar de que en los bateadores aparezcan posiciones defensivas se debe a que estos juegan tanto como ofensivos como defensivos. Estando en la ofensiva se juega en las misma posición que todos por lo que no es necesario especificar que ocupala posición de bateador (**H**). Sin embargo, cuando se dice que es un bateador designado (**DH**) ya que este solo juega en la ofensiva para sustituir a un lanzador/pitcher.

Por otro lado, veamos cuantas observaciones hay por posición.

```r
hitters_panel %>% count(Posicion_t, sort = TRUE)
```

```
   Posicion_t   n
1          SP 112
2           C  76
3          LF  60
4          RF  59
5          2B  53
6          RP  47
7          1B  45
8          3B  31
9          DH  31
10         CF  28
11         SS  27
12         OF   1
```

```
fielders_panel %>% count(Posicion_t, sort = TRUE)
```

```
  Posicion_t   n
1         RP 299
2         SP 206
3      RP/CL  22
4         SS  12
5         RF   3
```

Continuemos con la segmentación de acuerdo a categorías. Primero, obtendremos el split de todas las posiciones y luego concatenaremos de acuerdo a los grupos de interés:

Ofensivos:

- **Bateador designado (DH).**
- **No bateador designado (H).**

Debido a la falta de observaciones para los *outfielders* es que se omitirá su estimación. Por otro lado, debido a que la mayoría de los datos para los fildeadores son de los lanzadores, podemos agruparlos de la siguiente manera

Defensivos:

- **Starting pitcher:** Lanzador inicial (SP).
- **Relief pitcher:** Lanzador de relevo (RP) y lanzador de cierre (RP/CL)
- **Campo corto (SS).**

Segundo, crearemos las categorías de acuerdo a la especificación mencionada arriba

Tercero, concatenaremos estas bases de datos de acuerdo a los grupos señalados anteriormente

Veamos las dimensiones de cada una de los paneles sin el shock de la COVID-19:

```
print("Regular hitter: ")
```

```
[1] "Regular hitter: "
```

```r
print(dim(hitter_cov_data))
```

```
[1] 501 209
```

```r
print("")
```

```
[1] ""
```

```r
print("Designated hitter: ")
```

```
[1] "Designated hitter: "
```

```r
print(dim(d_hitter_cov_data))
```

```
[1]  30 209
```

```r
print("")
```

```
[1] ""
```

```r
print("Relief pitchers: ")
```

```
[1] "Relief pitchers: "
```

```r
print(dim(relief_pitcher_cov_data))
```

```
[1] 296 225
```

```r
print("")
```

```
[1] ""
```

```r
print("Starting pitchers: ")
```

```
[1] "Starting pitchers: "
```

```r
print(dim(starting_cov_data))
```

```
[1] 185 225
```

```r
print("")
```

```
[1] ""
```

```r
print("Short stops: ")
```

```
[1] "Short stops: "
```

```r
print(dim(shorts_cov_data))
```

```
[1]  12 225
```

Estimaciones y regresiones

Lo que resta hacer es implementar un algoritmo donde se pueda hacer el siguiente modelo para todas las estadísticas deportiva de acuerdo a si el jugador es defensivo u ofensivo:

$$Y_t(\cdot) = \beta_0 X_t + \beta_1 \text{Controles}_t + u_t$$

donde

- $Controles_t$:
  - Equipo.
  - Edad.
  - Año.
- α: Heterogeneidad del jugador.

Creemos la lista de variables sobre las cuáles se va a iterar el clico

Variables para los fildeadores

Las variables base para ambos tipos de jugadores son los controles

```r
# Constroles:
vars_ms  <- 'Y_Sueldo_regular_norm_t ~ Edad_t + Anios_de_contrato_t + team_num_t'
# Constroles:
vars_fe  <- 'Y_Sueldo_regular_norm_t ~ Edad_t + Anios_de_contrato_t + team_num_t -1'
```

```r
hitter_stats_1 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                   "$X_{AB_{t}}$","$X_{AB_{t-1}}$","$X_{AB^{2}_{t}}$","$X_{AB^{2}_{t-1}}$",
                   "$X_{H_{t}}$","$X_{H_{t-1}}$","$X_{H^{2}_{t}}$","$X_{H^{2}_{t-1}}$",
                   "$X_{BA_{t}}$","$X_{BA_{t-1}}$", "$X_{BA^{2}_{t}}$","$X_{BA^{2}_{t-1}}$",
                   "Agente$_{t}$")
hitter_stats_2 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                   "$X_{D_{t}}$","$X_{D_{t-1}}$","$X_{D^{2}_{t}}$","$X_{D^{2}_{t-1}}$",
                   "$X_{HR_{t}}$","$X_{HR_{t-1}}$","$X_{HR^{2}_{t}}$","$X_{HR^{2}_{t-1}}$",
                   "$X_{GS_{t}}$","$X_{GS_{t-1}}$", "$X_{GS^{2}_{t}}$","$X_{GS^{2}_{t-1}}$",
                   "Agente$_{t}$")
hitter_stats_3 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                   "$X_{OPS_{t}}$","$X_{OPS_{t-1}}$","$X_{OPS^{2}_{t}}$","$X_{OPS^{2}_{t-1}}$",
                   "$X_{OBP_{t}}$","$X_{OBP_{t-1}}$","$X_{OBP^{2}_{t}}$","$X_{OBP^{2}_{t-1}}$",
                   "$X_{SLG_{t}}$","$X_{SLG_{t-1}}$", "$X_{SLG^{2}_{t}}$","$X_{SLG^{2}_{t-1}}$",
                   "Agente$_{t}$")
hitter_stats_4 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
```

```
                    "$X_{RBI_{t}}$","$X_{RBI_{t-1}}$","$X_{RBI^{2}_{t}}$","$X_{RBI^{2}_{t-1}}$",
                    "$X_{T_{t}}$","$X_{T_{t-1}}$","$X_{T^{2}_{t}}$","$X_{T^{2}_{t-1}}$",
                    "$X_{WAR_{t}}$","$X_{WAR_{t-1}}$", "$X_{WAR^{2}_{t}}$","$X_{WAR^{2}_{t-1}}$",
                    "Agente$_{t}$")
hitter_stats <- list(hitter_stats_1,
                      hitter_stats_2,
                      hitter_stats_3,
                      hitter_stats_4)

# Cycles for loop
hitter_rep <- 4
# Stats to show
hitter_stat_num <- 6
```

```
fielder_stats_1 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                     "$X_{H^{2}_{t}}$","$X_{H^{2}_{t-1}}$","$X_{H_{t}}$","$X_{H_{t-1}}$",
                     "$X_{R^{2}_{t}}$","$X_{R^{2}_{t-1}}$","$X_{ER^{2}_{t}}$","$X_{ER^{2}_{t-1}}$",
                     "$X_{ER_{t}}$","$X_{ER_{t-1}}$", "$X_{R_{t}}$","$X_{R_{t-1}}$",
                     "Agente$_{t}$")
fielder_stats_2 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                     "$X_{Comando^{2}_{t}}$","$X_{Comando^{2}_{t-1}}$","$X_{Comando_{t}}$","$X_{Comando_
                     "$X_{Control^{2}_{t}}$","$X_{Control^{2}_{t-1}}$","$Control_{H_{t}}$","$X_{Control_
                     "$X_{Dominio^{2}_{t}}$","$X_{Dominio^{2}_{t-1}}$","$X_{Dominio_{t}}$","$X_{Dominio_
                     "Agente$_{t}$")
fielder_stats_3 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                     "$X_{ERA^{2}_{t}}$","$X_{ERA^{2}_{t-1}}$","$X_{ERA_{t}}$","$X_{ERA_{t-1}}$",
                     "$X_{IP^{2}_{t}}$","$X_{IP^{2}_{t-1}}$","$X_{IP_{t}}$","$X_{IP_{t-1}}$",
                     "$X_{L^{2}_{t}}$","$X_{L^{2}_{t-1}}$", "$X_{L_{t}}$","$X_{L_{t-1}}$",
                     "Agente$_{t}$")
fielder_stats_4 = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                     "$X_{S^{2}_{t}}$","$X_{S^{2}_{t-1}}$","$X_{S_{t}}$","$X_{S_{t-1}}$",
                     "$X_{SO^{2}_{t}}$","$X_{SO^{2}_{t-1}}$","$X_{SO_{t}}$","$X_{SO_{t-1}}$",
                     "$X_{WAR^{2}_{t}}$","$X_{WAR^{2}_{t-1}}$","$X_{WAR_{t}}$","$X_{WAR_{t-1}}$",
                     "Agente$_{t}$")
fielder_stats_5 = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                     "$X_{WHIP^{2}_{t}}$","$X_{WHIP^{2}_{t-1}}$","$X_{WHIP_{t}}$","$X_{WHIP_{t-1}}$",
                     "$X_{BB^{2}_{t}}$","$X_{BB^{2}_{t-1}}$","$X_{BB_{t}}$","$X_{BB_{t-1}}$",
                     "$X_{W^{2}_{t}}$","$X_{W^{2}_{t-1}}$","$X_{W_{t}}$","$X_{W_{t-1}}$",
                     "Agente$_{t}$")
fielder_stats <- list(fielder_stats_1,
                       fielder_stats_2,
                       fielder_stats_3,
                       fielder_stats_4,
                       fielder_stats_5)
# Cycles for loop
fielder_rep <- 5
# Stats to show
fielder_stat_num <- 6
```

Estimaciones directas

Pooling

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```
# Create a model to store the results
hitter_simple_pooling <- list()

# To store the results
hitter_results_simple_pooling_1 <- list()
hitter_results_simple_pooling_2 <- list()
hitter_results_simple_pooling_3 <- list()
hitter_results_simple_pooling_4 <- list()
hitter_results_simple_pooling <- list(result_1 = hitter_results_simple_pooling_1,
                                      result_2 = hitter_results_simple_pooling_2,
                                      result_3 = hitter_results_simple_pooling_3,
                                      result_4 = hitter_results_simple_pooling_4)

# Loop over the variables in var_hitter_list
for (j in 1:hitter_rep){

  for (i in 1:hitter_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_hitter_t[[i + hitter_stat_num*(j - 1)]],
                          sep = '+')
    formula <- paste(base_vars_h,
                     stat_hitter_t_1[[i + hitter_stat_num*(j - 1)]],
                     sep = " + ")

    hitter_simple_pooling[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = hitter_data,
                                                                model = "pooling",
                                                                index = c("id", "Anio_ref"))

    hitter_results_simple_pooling[[j]][[i]] <- coeftest(hitter_simple_pooling[[i + hitter_stat_num*(j -
                                                              vcov = vcovHC(hitter_simple_pooling[[i + hitter_
                                                                            type = "HC1",
                                                                            cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_pooling[[j]],
            no.space = TRUE,
            type = "text",
            title = "Bateadores: Modelo Pooling",
            covariate.labels = hitter_stats[[j]])
}
```

```
Bateadores: Modelo Pooling
=====================================================================
                                Dependent variable:
```

	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
Años contratot	0.001	-0.001	0.001	-0.001	-0.0003	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XABt	-0.001					
	(0.001)					
XABt-1	-0.001					
	(0.001)					
XAB2t		-0.00002				
		(0.00004)				
XAB2t-1		-0.00000				
		(0.00003)				
XHt			-0.002*			
			(0.001)			
XHt-1			0.0003			
			(0.001)			
XH2t				-0.0001		
				(0.0001)		
XH2t-1				0.0001		
				(0.0001)		
XBAt					-0.031	
					(0.020)	
XBAt-1					0.020	
					(0.017)	
XBA2t						-0.046
						(0.029)
XBA2t-1						0.005
						(0.017)
Agentet	0.162*	0.157*	0.149*	0.153*	0.152*	0.149*
	(0.085)	(0.081)	(0.081)	(0.086)	(0.085)	(0.085)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Años contratot	0.001	-0.001	-0.002	-0.001	0.001	-0.001
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XDt	-0.004					

	(0.003)					
XDt-1	-0.001					
	(0.003)					
XD2t		-0.0004				
		(0.001)				
XD2t-1		0.001				
		(0.001)				
XHRt			-0.001			
			(0.004)			
XHRt-1			0.003			
			(0.002)			
XHR2t				-0.001		
				(0.001)		
XHR2t-1				-0.0001		
				(0.0004)		
XGSt					-0.002	
					(0.001)	
XGSt-1					-0.001	
					(0.001)	
XGS2t						-0.0001
						(0.0002)
XGS2t-1						0.00005
						(0.0001)
Agentet	0.150*	0.155*	0.158*	0.160*	0.161*	0.158*
	(0.080)	(0.083)	(0.083)	(0.083)	(0.084)	(0.081)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.006**	-0.005**	-0.006**	-0.005**	-0.006**	-0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Años contratot	-0.0004	0.0001	-0.001	-0.0002	0.0002	0.0002
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.004)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XOPSt	-0.021					
	(0.014)					
XOPSt-1	-0.001					
	(0.013)					
XOPS2t		-0.026**				
		(0.013)				
XOPS2t-1		0.008				
		(0.011)				
XOBPt			-0.043**			
			(0.022)			
XOBPt-1			0.020			
			(0.019)			

XOBP2t				-0.049*		
				(0.028)		
XOBP2t-1				0.006		
				(0.020)		
XSLGt					-0.018	
					(0.019)	
XSLGt-1					-0.023	
					(0.017)	
XSLG2t						-0.040*
						(0.022)
XSLG2t-1						0.014
						(0.018)
Agentet	0.160*	0.142*	0.156*	0.144*	0.167**	0.148*
	(0.085)	(0.086)	(0.083)	(0.083)	(0.082)	(0.085)

Note: *p<0.1; **p<0.05; ***p<0.01

Bateadores: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.006**	-0.006**	-0.006**	-0.006**	-0.007***	-0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Años contratot	0.0004	-0.002	-0.001	-0.001	-0.005	-0.002
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XRBIt	-0.003**					
	(0.001)					
XRBIt-1	0.001					
	(0.002)					
XRBI2t		0.0001				
		(0.0002)				
XRBI2t-1		0.0001				
		(0.0002)				
XTt			-0.010			
			(0.008)			
XTt-1			0.011**			
			(0.005)			
XT2t				-0.003		
				(0.004)		
XT2t-1				0.001		
				(0.001)		
XWARt					0.016**	
					(0.007)	
XWARt-1					0.013**	
					(0.006)	
XWAR2t						0.005
						(0.004)
XWAR2t-1						0.005**

```
                                                                (0.002)
Agentet          0.149*   0.165*   0.156*   0.156*   0.205**  0.180**
                (0.082)  (0.084)  (0.084)  (0.084)   (0.081)  (0.079)
=====================================================================
=====================================================================
Note:                                     *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```
# Create a model to store the results
fielder_simple_pooling <- list()

# To store the results
fielder_results_simple_pooling_1 <- list()
fielder_results_simple_pooling_2 <- list()
fielder_results_simple_pooling_3 <- list()
fielder_results_simple_pooling_4 <- list()
fielder_results_simple_pooling_5 <- list()
fielder_results_simple_pooling <- list(result_1 = fielder_results_simple_pooling_1,
                                       result_2 = fielder_results_simple_pooling_2,
                                       result_3 = fielder_results_simple_pooling_3,
                                       result_4 = fielder_results_simple_pooling_4,
                                       result_5 = fielder_results_simple_pooling_5)

# Loop over the variables in var_hitter_list
for (j in 1:fielder_rep){

  for (i in 1:fielder_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_fielder_t[[i + fielder_stat_num*(j - 1)]],
                          sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1[[i + fielder_stat_num*(j - 1)]],
                     sep = " + ")

    fielder_simple_pooling[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = starting_data,
                                                  model = "pooling",
                                                  index = c("id", "Anio_ref"))

    fielder_results_simple_pooling[[j]][[i]] <- coeftest(fielder_simple_pooling[[i + fielder_stat_num*(j
                                                       vcov = vcovHC(fielder_simple_pooling[[i + fiel
                                                                     type = "HC1",
                                                                     cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_pooling[[j]],
            no.space = TRUE,
            type = "text",
            title = "Lanzadores Iniciales: Modelo Pooling",
            covariate.labels = fielder_stats[[j]])
}
```

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.008*	-0.009**	-0.009**	-0.009**	-0.008**	-0.008**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.007	-0.010	-0.011	-0.011	-0.009	-0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Eqipot	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
XH2t	-0.0001					
	(0.0001)					
XH2t-1	-0.00005					
	(0.0001)					
XHt		-0.0005				
		(0.002)				
XHt-1		0.00002				
		(0.001)				
XR2t			0.00002			
			(0.0002)			
XR2t-1			-0.0001			
			(0.0001)			
XER2t				0.0001		
				(0.0002)		
XER2t-1				-0.0002		
				(0.0001)		
XERt					-0.002	
					(0.002)	
XERt-1					-0.001	
					(0.001)	
XRt						-0.001
						(0.002)
XRt-1						-0.001
						(0.001)
Agentet	0.227*	0.252**	0.257**	0.261**	0.243*	0.247**
	(0.121)	(0.123)	(0.124)	(0.129)	(0.125)	(0.124)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.008**	-0.009**	-0.009**	-0.008**	-0.007*	-0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.010	-0.010	-0.010	-0.011	-0.011	-0.011
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)

Eqipot	0.003*	0.003*	0.003**	0.003*	0.003**	0.003*
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
XComando2t	-0.001					
	(0.006)					
XComando2t-1	-0.00001					
	(0.00001)					
XComandot		-0.002				
		(0.012)				
XComandot-1		-0.001				
		(0.001)				
XControl2t			-0.061			
			(0.043)			
XControl2t-1			-0.122***			
			(0.033)			
ControlHt				0.042		
				(0.030)		
XControlt-1				-0.076**		
				(0.031)		
XDominio2t					-0.009	
					(0.023)	
XDominio2t-1					0.048**	
					(0.020)	
XDominiot						-0.015
						(0.019)
XDominiot-1						0.052***
						(0.018)
Agentet	0.244**	0.245**	0.241**	0.218*	0.191	0.195
	(0.119)	(0.120)	(0.119)	(0.118)	(0.122)	(0.126)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.008**	-0.008**	-0.008**	-0.008**	-0.008*	-0.008**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.010	-0.012	-0.007	-0.010	-0.011	-0.010
	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)
Eqipot	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XERA2t	-0.001					
	(0.003)					
XERA2t-1	-0.006**					
	(0.003)					
XERAt		-0.012*				
		(0.006)				
XERAt-1		-0.020***				
		(0.006)				
XIP2t			-0.0001			

			(0.0001)			
XIP2t-1			-0.00001			
			(0.0001)			
XIPt				-0.0005		
				(0.001)		
XIPt-1				-0.0002		
				(0.001)		
XL2t					-0.002	
					(0.002)	
XL2t-1					-0.001	
					(0.001)	
XLt						-0.004
						(0.006)
XLt-1						-0.004
						(0.004)
Agentet	0.236*	0.234**	0.234*	0.247*	0.241*	0.248**
	(0.125)	(0.113)	(0.120)	(0.130)	(0.127)	(0.125)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.010**	-0.010**	-0.009**	-0.009**	-0.009**	-0.010**
	(0.005)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.012	-0.012	-0.009	-0.012	-0.011	-0.015**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Eqipot	0.003*	0.003*	0.003*	0.003*	0.003*	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XS2t	0.087					
	(0.080)					
XS2t-1	0.023**					
	(0.009)					
XSt		0.051				
		(0.051)				
XSt-1		0.064**				
		(0.030)				
XSO2t			-0.0001			
			(0.0001)			
XSO2t-1			0.0001			
			(0.0001)			
XSOt				0.0004		
				(0.001)		
XSOt-1				-0.00002		
				(0.001)		
XWAR2t					0.003	
					(0.004)	
XWAR2t-1					-0.001	
					(0.005)	

	(1)	(2)	(3)	(4)	(5)	(6)
XWARt						0.013
						(0.009)
XWARt-1						0.008
						(0.011)
Agentet	0.288**	0.303**	0.257**	0.263**	0.262**	0.290**
	(0.144)	(0.146)	(0.119)	(0.126)	(0.119)	(0.124)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.007*	-0.009**	-0.009**	-0.009**	-0.009**	-0.008*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.013	-0.014*	-0.011	-0.012	-0.012	-0.008
	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Eqipot	0.003**	0.003**	0.003*	0.003*	0.003*	0.003*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
XWHIP2t	-0.008					
	(0.011)					
XWHIP2t-1	-0.043***					
	(0.011)					
XWHIPt		-0.007				
		(0.010)				
XWHIPt-1		-0.036***				
		(0.011)				
XBB2t			-0.0002			
			(0.0004)			
XBB2t-1			0.0001			
			(0.0003)			
XBBt				0.001		
				(0.003)		
XBBt-1				-0.002		
				(0.002)		
XW2t					0.001	
					(0.001)	
XW2t-1					0.0001	
					(0.001)	
XWt						-0.005
						(0.006)
XWt-1						0.0002
						(0.005)
Agentet	0.174	0.266**	0.256**	0.265**	0.262**	0.233*
	(0.112)	(0.115)	(0.122)	(0.130)	(0.122)	(0.130)

Note: *p<0.1; **p<0.05; ***p<0.01

Efectos fijos

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```
# Create a model to store the results
hitter_simple_within <- list()

# To store the results
hitter_results_simple_within_1 <- list()
hitter_results_simple_within_2 <- list()
hitter_results_simple_within_3 <- list()
hitter_results_simple_within_4 <- list()
hitter_results_simple_within <- list(result_1 = hitter_results_simple_within_1,
                                     result_2 = hitter_results_simple_within_2,
                                     result_3 = hitter_results_simple_within_3,
                                     result_4 = hitter_results_simple_within_4)

# Loop over the variables in var_hitter_list
for (j in 1:hitter_rep){

  for (i in 1:hitter_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_hitter_t[[i + hitter_stat_num*(j - 1)]],
                        sep = '+')
    formula <- paste(base_vars_h,
                     stat_hitter_t_1[[i + hitter_stat_num*(j - 1)]],
                     sep = " + ")

    hitter_simple_within[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = hitter_data,
                                                   model = "within",
                                                   index = c("id", "Anio_ref"))

    hitter_results_simple_within[[j]][[i]] <- coeftest(hitter_simple_within[[i + hitter_stat_num*(j - 1
                                                         vcov = vcovHC(hitter_simple_within[[i + hitter_s
                                                                       type = "HC1",
                                                                       cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_within[[j]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Estimador Within",
          covariate.labels = hitter_stats[[j]])
}
```

```
Bateadores: Estimador Within
======================================================================
                                 Dependent variable:
               -------------------------------------------------------

                  (1)        (2)       (3)       (4)       (5)        (6)
```

Edadt	-0.003	-0.004	-0.004	-0.004	-0.004	-0.004
	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
Años contratot	-0.032***	-0.032**	-0.032**	-0.031**	-0.031**	-0.032***
	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XABt	0.001					
	(0.001)					
XABt-1	0.0003					
	(0.001)					
XAB2t		0.00000				
		(0.00004)				
XAB2t-1		0.00000				
		(0.00004)				
XHt			-0.0005			
			(0.002)			
XHt-1			-0.0001			
			(0.002)			
XH2t				-0.0002		
				(0.0002)		
XH2t-1				-0.0001		
				(0.0002)		
XBAt					-0.004	
					(0.030)	
XBAt-1					0.034	
					(0.028)	
XBA2t						0.010
						(0.046)
XBA2t-1						0.011
						(0.024)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.004	-0.004	-0.003	-0.004	-0.003	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Años contratot	-0.032***	-0.032**	-0.034***	-0.034***	-0.032***	-0.032**
	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)	(0.012)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XDt	0.001					
	(0.005)					
XDt-1	-0.001					
	(0.003)					
XD2t		0.00000				
		(0.001)				

XD2t-1		-0.0004				
		(0.001)				
XHRt			0.005			
			(0.005)			
XHRt-1			0.001			
			(0.004)			
XHR2t				0.001		
				(0.001)		
XHR2t-1				-0.0002		
				(0.001)		
XGSt					0.001	
					(0.002)	
XGSt-1					0.0004	
					(0.002)	
XGS2t						0.0001
						(0.0002)
XGS2t-1						0.00002
						(0.0002)

Note: *p<0.1; **p<0.05; ***p<0.01

Bateadores: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Años contratot	-0.031**	-0.032**	-0.031**	-0.033***	-0.030**	-0.033***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.012)
Eqipot	0.001	0.001	0.001	0.002	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XOPSt	-0.013					
	(0.020)					
XOPSt-1	-0.002					
	(0.018)					
XOPS2t		0.002				
		(0.021)				
XOPS2t-1		-0.003				
		(0.016)				
XOBPt			-0.002			
			(0.040)			
XOBPt-1			0.029			
			(0.032)			
XOBP2t				0.054		
				(0.045)		
XOBP2t-1				0.025		
				(0.027)		
XSLGt					-0.015	
					(0.026)	
XSLGt-1					-0.026	

					(0.030)	
XSLG2t						0.019
						(0.030)
XSLG2t-1						-0.016
						(0.029)
Note:						*p<0.1; **p<0.05; ***p<0.01

Bateadores: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.003	-0.004	-0.002	-0.003	-0.006	-0.004
	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
Años contratot	-0.033***	-0.032***	-0.034***	-0.032**	-0.039***	-0.035***
	(0.013)	(0.012)	(0.013)	(0.013)	(0.012)	(0.013)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XRBIt	0.001					
	(0.002)					
XRBIt-1	0.001					
	(0.002)					
XRBI2t		0.0001				
		(0.0004)				
XRBI2t-1		-0.0002				
		(0.0003)				
XTt			-0.021			
			(0.014)			
XTt-1			0.001			
			(0.014)			
XT2t				-0.002		
				(0.005)		
XT2t-1				0.001		
				(0.004)		
XWARt					0.035***	
					(0.009)	
XWARt-1					0.003	
					(0.008)	
XWAR2t						0.011
						(0.008)
XWAR2t-1						-0.0001
						(0.003)
Note:						*p<0.1; **p<0.05; ***p<0.01

Starting pitcher

```r
# Create a model to store the results
fielder_simple_within <- list()

# To store the results
fielder_results_simple_within_1 <- list()
fielder_results_simple_within_2 <- list()
fielder_results_simple_within_3 <- list()
fielder_results_simple_within_4 <- list()
fielder_results_simple_within_5 <- list()
fielder_results_simple_within <- list(result_1 = fielder_results_simple_within_1,
                                       result_2 = fielder_results_simple_within_2,
                                       result_3 = fielder_results_simple_within_3,
                                       result_4 = fielder_results_simple_within_4,
                                       result_5 = fielder_results_simple_within_5)

# Loop over the variables in var_hitter_list
for (j in 1:fielder_rep){

  for (i in 1:fielder_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_fielder_t[[i + fielder_stat_num*(j - 1)]],
                        sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1[[i + fielder_stat_num*(j - 1)]],
                     sep = " + ")

    fielder_simple_within[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = starting_data,
                                                   model = "within",
                                                   index = c("id", "Anio_ref"))

    fielder_results_simple_within[[j]][[i]] <- coeftest(fielder_simple_within[[i + fielder_stat_num*(j -
                                                          vcov = vcovHC(fielder_simple_within[[i + fielde
                                                                        type = "HC1",
                                                                        cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_within[[j]],
          no.space = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: Estimador Within",
          covariate.labels = fielder_stats[[j]])
}
```

```
Lanzadores Iniciales: Estimador Within
==================================================================
                               Dependent variable:
               ---------------------------------------------------

                 (1)      (2)      (3)      (4)      (5)     (6)
------------------------------------------------------------------
```

Edadt	-0.031**	-0.030**	-0.031*	-0.031**	-0.028*	-0.028*
	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)
Años contratot	-0.021	-0.037*	-0.028	-0.025	-0.032	-0.034*
	(0.019)	(0.020)	(0.019)	(0.017)	(0.020)	(0.020)
Eqipot	0.003	0.004*	0.004*	0.004	0.004*	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XH2t	-0.0001					
	(0.0002)					
XH2t-1	-0.0001					
	(0.0001)					
XHt		0.004				
		(0.002)				
XHt-1		-0.001				
		(0.002)				
XR2t			0.0002			
			(0.0003)			
XR2t-1			-0.0003			
			(0.0002)			
XER2t				-0.0002		
				(0.0004)		
XER2t-1				-0.0004		
				(0.0002)		
XERt					0.003	
					(0.002)	
XERt-1					-0.0003	
					(0.002)	
XRt						0.004*
						(0.002)
XRt-1						0.001
						(0.002)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.029**	-0.029**	-0.027*	-0.025*	-0.029*	-0.028*
	(0.014)	(0.014)	(0.016)	(0.015)	(0.015)	(0.014)
Años contratot	-0.026	-0.027	-0.025	-0.027	-0.024	-0.028
	(0.020)	(0.022)	(0.020)	(0.020)	(0.020)	(0.019)
Eqipot	0.004*	0.004	0.004	0.004**	0.004*	0.003
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
XComando2t	-0.013*					
	(0.008)					
XComando2t-1	0.00001**					
	(0.00000)					
XComandot		-0.004				
		(0.022)				
XComandot-1		0.001				

	(1)	(2)	(3)	(4)	(5)	(6)
		(0.001)				
XControl2t			0.004			
			(0.088)			
XControl2t-1			-0.027			
			(0.050)			
ControlHt				0.025		
				(0.063)		
XControlt-1				-0.061		
				(0.053)		
XDominio2t					-0.025	
					(0.029)	
XDominio2t-1					0.010	
					(0.030)	
XDominiot						0.011
						(0.025)
XDominiot-1						0.009
						(0.030)
Note:	*p<0.1; **p<0.05; ***p<0.01					

Lanzadores Iniciales: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.023	-0.022	-0.029*	-0.030*	-0.030**	-0.029**
	(0.015)	(0.013)	(0.015)	(0.015)	(0.015)	(0.014)
Años contratot	-0.018	-0.023	-0.024	-0.030	-0.027	-0.028
	(0.019)	(0.019)	(0.018)	(0.022)	(0.018)	(0.019)
Eqipot	0.003	0.003	0.004	0.004	0.004*	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XERA2t	0.006					
	(0.005)					
XERA2t-1	-0.003					
	(0.005)					
XERAt		0.003				
		(0.013)				
XERAt-1		-0.023**				
		(0.011)				
XIP2t			-0.00003			
			(0.0002)			
XIP2t-1			-0.0001			
			(0.0001)			
XIPt				0.001		
				(0.002)		
XIPt-1				-0.001		
				(0.002)		
XL2t					-0.001	
					(0.003)	
XL2t-1					-0.001	
					(0.001)	

XLt						0.004
						(0.009)
XLt-1						-0.008
						(0.006)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Estimador Within

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.029**	-0.029**	-0.028**	-0.028*	-0.027**	-0.029*
	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)	(0.015)
Años contratot	-0.027	-0.027	-0.030	-0.035*	-0.022	-0.026
	(0.019)	(0.020)	(0.019)	(0.021)	(0.022)	(0.023)
Eqipot	0.004	0.004*	0.004*	0.004	0.004*	0.004
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
XS2t	0.098***					
	(0.004)					
XS2t-1	0.040**					
	(0.018)					
XSt		0.069***				
		(0.010)				
XSt-1		0.057				
		(0.035)				
XSO2t			-0.00003			
			(0.0001)			
XSO2t-1			0.0003*			
			(0.0002)			
XSOt				0.002		
				(0.002)		
XSOt-1				0.001		
				(0.002)		
XWAR2t					-0.001	
					(0.003)	
XWAR2t-1					-0.007**	
					(0.003)	
XWARt						0.001
						(0.012)
XWARt-1						-0.004
						(0.018)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Estimador Within

Dependent variable:

```
                (1)     (2)     (3)      (4)     (5)     (6)
---------------------------------------------------------------
Edadt          -0.022  -0.026* -0.028** -0.027* -0.030* -0.029*
               (0.014) (0.015) (0.014)  (0.014) (0.016) (0.015)
Años contratot -0.018  -0.021   -0.028  -0.027  -0.029  -0.024
               (0.018) (0.018) (0.018)  (0.018) (0.020) (0.018)
Eqipot          0.004   0.004   0.004   0.004*   0.004   0.004
               (0.002) (0.002) (0.002)  (0.002) (0.002) (0.002)
XWHIP2t         0.024
               (0.019)
XWHIP2t-1      -0.017
               (0.015)
XWHIPt                  0.020
                       (0.021)
XWHIPt-1               -0.015
                       (0.020)
XBB2t                           0.0002
                               (0.001)
XBB2t-1                         0.0002
                               (0.0004)
XBBt                                    0.0002
                                        (0.003)
XBBt-1                                   0.002
                                        (0.003)
XW2t                                             0.001
                                                (0.002)
XW2t-1                                          -0.001
                                                (0.001)
XWt                                                     -0.002
                                                        (0.006)
XWt-1                                                   -0.003
                                                        (0.006)
===============================================================
===============================================================
Note:                              *p<0.1; **p<0.05; ***p<0.01
```

Efectos aleatorios

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```r
# Create a model to store the results
hitter_simple_random <- list()

# To store the results
hitter_results_simple_random_1 <- list()
hitter_results_simple_random_2 <- list()
hitter_results_simple_random_3 <- list()
hitter_results_simple_random_4 <- list()
hitter_results_simple_random <- list(result_1 = hitter_results_simple_random_1,
                                     result_2 = hitter_results_simple_random_2,
                                     result_3 = hitter_results_simple_random_3,
```

```r
                                    result_4 = hitter_results_simple_random_4)

# Loop over the variables in var_hitter_list
for (j in 1:hitter_rep){

  for (i in 1:hitter_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_hitter_t[[i + hitter_stat_num*(j - 1)]],
                          sep = '+')
    formula <- paste(base_vars_h,
                     stat_hitter_t_1[[i + hitter_stat_num*(j - 1)]],
                     sep = " + ")

    hitter_simple_random[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = hitter_data,
                                                 model = "random",
                                                 index = c("id", "Anio_ref"))

    hitter_results_simple_random[[j]][[i]] <- coeftest(hitter_simple_random[[i + hitter_stat_num*(j - 1
                                                       vcov = vcovHC(hitter_simple_random[[i + hitter_s
                                                                     type = "HC1",
                                                                     cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_random[[j]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Efectos Aleatorios",
          covariate.labels = hitter_stats[[j]])
}
```

```
Bateadores: Efectos Aleatorios
====================================================================
                                 Dependent variable:
               -----------------------------------------------------

                 (1)       (2)      (3)      (4)      (5)      (6)
--------------------------------------------------------------------
Edadt          -0.006** -0.005**  -0.005** -0.005** -0.005** -0.005*
               (0.003)   (0.003)  (0.003)  (0.003)  (0.003)  (0.003)
Años contratot  -0.002   -0.003    -0.002   -0.003   -0.003   -0.003
               (0.004)   (0.004)  (0.004)  (0.004)  (0.004)  (0.004)
Eqipot          0.001     0.001    0.001    0.001    0.001    0.001
               (0.001)   (0.001)  (0.001)  (0.001)  (0.001)  (0.001)
XABt           -0.0002
               (0.001)
XABt-1         -0.0004
               (0.001)
XAB2t                   -0.00001
                        (0.00003)
XAB2t-1                 -0.00000
                        (0.00002)
XHt                                -0.001
```

			(0.001)			
XHt-1			0.0002			
			(0.001)			
XH2t				-0.0001		
				(0.0001)		
XH2t-1				0.00005		
				(0.0001)		
XBAt					-0.024	
					(0.018)	
XBAt-1					0.019	
					(0.016)	
XBA2t						-0.036
						(0.027)
XBA2t-1						0.005
						(0.016)
Agentet	0.155*	0.148*	0.145*	0.142*	0.142*	0.140*
	(0.087)	(0.083)	(0.083)	(0.085)	(0.086)	(0.084)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.005**	-0.005**	-0.005**	-0.005**	-0.006**	-0.005**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Años contratot	-0.002	-0.003	-0.004	-0.003	-0.002	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XDt	-0.003					
	(0.003)					
XDt-1	-0.001					
	(0.002)					
XD2t		-0.0003				
		(0.0005)				
XD2t-1		0.0003				
		(0.0004)				
XHRt			0.0003			
			(0.003)			
XHRt-1			0.002			
			(0.002)			
XHR2t				-0.0004		
				(0.001)		
XHR2t-1				-0.00001		
				(0.0003)		
XGSt					-0.001	
					(0.001)	
XGSt-1					-0.001	
					(0.001)	

XGS2t						-0.00001
						(0.0001)
XGS2t-1						0.00004
						(0.0001)
Agentet	0.143*	0.146*	0.145*	0.147*	0.155*	0.147*
	(0.081)	(0.084)	(0.084)	(0.084)	(0.086)	(0.083)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.005**	-0.005*	-0.005**	-0.005**	-0.005**	-0.005*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Años contratot	-0.003	-0.002	-0.003	-0.003	-0.002	-0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Eqipot	0.001	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XOPSt	-0.019					
	(0.013)					
XOPSt-1	-0.002					
	(0.012)					
XOPS2t		-0.019*				
		(0.011)				
XOPS2t-1		0.006				
		(0.010)				
XOBPt			-0.034			
			(0.021)			
XOBPt-1			0.018			
			(0.018)			
XOBP2t				-0.030		
				(0.026)		
XOBP2t-1				0.006		
				(0.018)		
XSLGt					-0.015	
					(0.016)	
XSLGt-1					-0.024	
					(0.015)	
XSLG2t						-0.026
						(0.019)
XSLG2t-1						0.008
						(0.017)
Agentet	0.152*	0.135	0.148*	0.140*	0.159*	0.143*
	(0.086)	(0.086)	(0.084)	(0.083)	(0.083)	(0.086)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Efectos Aleatorios

```
=====================================================================
                                   Dependent variable:
               ------------------------------------------------------

                  (1)      (2)      (3)      (4)      (5)      (6)
---------------------------------------------------------------------
Edadt          -0.005** -0.005** -0.005** -0.005** -0.006** -0.006**
                (0.003)  (0.003)  (0.003)  (0.003)  (0.003)  (0.002)
Años contratot  -0.002   -0.004   -0.004   -0.003  -0.008**  -0.004
                (0.004)  (0.004)  (0.004)  (0.004)  (0.004)  (0.004)
Eqipot           0.001    0.001    0.001    0.001    0.001    0.001
                (0.001)  (0.001)  (0.001)  (0.001)  (0.001)  (0.001)
XRBIt           -0.002
                (0.001)
XRBIt-1          0.001
                (0.002)
XRBI2t                    0.0001
                         (0.0002)
XRBI2t-1                 0.00005
                         (0.0002)
XTt                                -0.010
                                  (0.008)
XTt-1                              0.010*
                                  (0.005)
XT2t                                        -0.002
                                           (0.003)
XT2t-1                                      0.001
                                           (0.001)
XWARt                                               0.019***
                                                    (0.006)
XWARt-1                                              0.010*
                                                    (0.005)
XWAR2t                                                         0.005
                                                              (0.003)
XWAR2t-1                                                      0.003*
                                                              (0.002)
Agentet          0.145*   0.152*   0.144*   0.145*  0.197**  0.165**
                (0.084)  (0.083)  (0.084)  (0.085)  (0.084)  (0.080)
=====================================================================
=====================================================================
Note:                                    *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```r
# Create a model to store the results
fielder_simple_random <- list()

# To store the results
fielder_results_simple_random_1 <- list()
fielder_results_simple_random_2 <- list()
fielder_results_simple_random_3 <- list()
fielder_results_simple_random_4 <- list()
```

```r
fielder_results_simple_random_5 <- list()
fielder_results_simple_random <- list(result_1 = fielder_results_simple_random_1,
                                       result_2 = fielder_results_simple_random_2,
                                       result_3 = fielder_results_simple_random_3,
                                       result_4 = fielder_results_simple_random_4,
                                       result_5 = fielder_results_simple_random_5)

# Loop over the variables in var_hitter_list
for (j in 1:fielder_rep){

  for (i in 1:fielder_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_fielder_t[[i + fielder_stat_num*(j - 1)]],
                         sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1[[i + fielder_stat_num*(j - 1)]],
                     sep = " + ")

    fielder_simple_random[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = starting_data,
                                                  model = "random",
                                                  index = c("id", "Anio_ref"))

    fielder_results_simple_random[[j]][[i]] <- coeftest(fielder_simple_random[[i + fielder_stat_num*(j -
                                                  vcov = vcovHC(fielder_simple_random[[i + fielde
                                                                type = "HC1",
                                                                cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_random[[j]],
          no.space = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: Efectos Aleatorios",
          covariate.labels = fielder_stats[[j]])
}
```

```
Lanzadores Iniciales: Efectos Aleatorios
====================================================================
                                 Dependent variable:
               -----------------------------------------------------

                 (1)      (2)      (3)      (4)      (5)      (6)
--------------------------------------------------------------------
Edadt          -0.010** -0.011** -0.011** -0.011** -0.010** -0.011**
               (0.005)  (0.005)  (0.005)  (0.005)  (0.005)  (0.005)
Años contratot  -0.007   -0.012   -0.011   -0.011   -0.010   -0.011
               (0.007)  (0.007)  (0.007)  (0.007)  (0.007)  (0.007)
Eqipot          0.003*  0.003**  0.003**   0.003*  0.003**  0.003**
               (0.001)  (0.001)  (0.001)  (0.001)  (0.001)  (0.001)
XH2t           -0.0001
               (0.0001)
XH2t-1         -0.00003
               (0.0001)
```

	(1)	(2)	(3)	(4)	(5)	(6)
XHt		0.0004				
		(0.002)				
XHt-1		-0.0001				
		(0.001)				
XR2t			0.0001			
			(0.0002)			
XR2t-1			-0.0001			
			(0.0001)			
XER2t				0.0001		
				(0.0002)		
XER2t-1				-0.0002		
				(0.0001)		
XERt					-0.001	
					(0.002)	
XERt-1					-0.001	
					(0.001)	
XRt						0.0001
						(0.002)
XRt-1						-0.001
						(0.001)
Agentet	0.290*	0.328**	0.324**	0.327**	0.311**	0.316**
	(0.150)	(0.152)	(0.153)	(0.160)	(0.154)	(0.154)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.010**	-0.010**	-0.010**	-0.009**	-0.009**	-0.009*
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Años contratot	-0.010	-0.010	-0.010	-0.012*	-0.011	-0.012
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)
Eqipot	0.003*	0.003*	0.003**	0.003*	0.003**	0.003*
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
XComando2t	-0.002					
	(0.006)					
XComando2t-1	-0.00000					
	(0.00000)					
XComandot		-0.003				
		(0.013)				
XComandot-1		-0.0004				
		(0.001)				
XControl2t			-0.057			
			(0.042)			
XControl2t-1			-0.106***			
			(0.030)			
ControlHt				0.030		
				(0.028)		
XControlt-1				-0.072**		

	(1)	(2)	(3)	(4)	(5)	(6)
				(0.032)		
XDominio2t					-0.012	
					(0.020)	
XDominio2t-1					0.042**	
					(0.019)	
XDominiot						-0.010
						(0.018)
XDominiot-1						0.044***
						(0.017)
Agentet	0.306**	0.307**	0.279*	0.268*	0.277*	0.272*
	(0.147)	(0.145)	(0.147)	(0.145)	(0.143)	(0.145)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.010**	-0.010**	-0.010**	-0.011**	-0.010**	-0.010**
	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)
Años contratot	-0.010	-0.012	-0.008	-0.011	-0.011	-0.010
	(0.008)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)
Eqipot	0.003*	0.003*	0.003*	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XERA2t	-0.0004					
	(0.002)					
XERA2t-1	-0.006**					
	(0.003)					
XERAt		-0.009				
		(0.007)				
XERAt-1		-0.021***				
		(0.006)				
XIP2t			-0.0001			
			(0.0001)			
XIP2t-1			-0.00000			
			(0.0001)			
XIPt				-0.0002		
				(0.001)		
XIPt-1				-0.0001		
				(0.001)		
XL2t					-0.001	
					(0.002)	
XL2t-1					-0.001	
					(0.001)	
XLt						-0.003
						(0.006)
XLt-1						-0.005
						(0.004)
Agentet	0.291*	0.292**	0.294**	0.315*	0.309**	0.309**
	(0.152)	(0.139)	(0.148)	(0.163)	(0.154)	(0.155)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.011**	-0.012**	-0.011**	-0.011**	-0.011**	-0.011**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Años contratot	-0.012	-0.012*	-0.009	-0.013*	-0.011	-0.014*
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Eqipot	0.003**	0.003**	0.003**	0.003*	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XS2t	0.104***					
	(0.033)					
XS2t-1	0.024***					
	(0.008)					
XSt		0.067***				
		(0.025)				
XSt-1		0.060**				
		(0.026)				
XSO2t			-0.0001			
			(0.0001)			
XSO2t-1			0.0001			
			(0.0001)			
XSOt				0.001		
				(0.001)		
XSOt-1				0.0002		
				(0.001)		
XWAR2t					0.001	
					(0.004)	
XWAR2t-1					-0.002	
					(0.004)	
XWARt						0.010
						(0.009)
XWARt-1						0.007
						(0.011)
Agentet	0.342**	0.353**	0.317**	0.335**	0.319**	0.351**
	(0.155)	(0.157)	(0.148)	(0.156)	(0.143)	(0.146)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Efectos Aleatorios

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)

```
Edadt             -0.008*   -0.011**  -0.011** -0.011** -0.011** -0.010**
                  (0.004)   (0.004)   (0.005)  (0.005)  (0.005)  (0.005)
Años contratot    -0.013    -0.013*    -0.010   -0.012   -0.012*   -0.009
                  (0.008)   (0.008)   (0.007)  (0.007)  (0.007)  (0.007)
Eqipot            0.003**   0.003**   0.003**   0.003*   0.003**  0.003**
                  (0.001)   (0.001)   (0.001)  (0.001)  (0.001)  (0.001)
XWHIP2t           -0.006
                  (0.011)
XWHIP2t-1        -0.039***
                  (0.010)
XWHIPt                      -0.005
                            (0.010)
XWHIPt-1                   -0.032***
                            (0.011)
XBB2t                                 -0.0002
                                      (0.0003)
XBB2t-1                                0.0001
                                      (0.0003)
XBBt                                             0.001
                                                (0.002)
XBBt-1                                          -0.001
                                                (0.002)
XW2t                                                      0.001
                                                         (0.001)
XW2t-1                                                    0.0002
                                                         (0.001)
XWt                                                               -0.004
                                                                  (0.005)
XWt-1                                                              0.001
                                                                  (0.004)
Agentet            0.222    0.317**   0.314**  0.326**  0.326**   0.295*
                  (0.136)   (0.141)   (0.149)  (0.156)  (0.150)  (0.161)
========================================================================
========================================================================
Note:                                         *p<0.1; **p<0.05; ***p<0.01
```

First Differences

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```r
# Create a model to store the results
hitter_simple_fd <- list()

# To store the results
hitter_results_simple_fd_1 <- list()
hitter_results_simple_fd_2 <- list()
hitter_results_simple_fd_3 <- list()
hitter_results_simple_fd_4 <- list()
hitter_results_simple_fd <- list(result_1 = hitter_results_simple_fd_1,
                                 result_2 = hitter_results_simple_fd_2,
                                 result_3 = hitter_results_simple_fd_3,
```

```r
                                  result_4 = hitter_results_simple_fd_4)

# Loop over the variables in var_hitter_list
for (j in 1:hitter_rep){

  for (i in 1:hitter_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_hitter_t[[i + hitter_stat_num*(j - 1)]],
                          sep = '+')
    formula <- paste(base_vars_h,
                     stat_hitter_t_1[[i + hitter_stat_num*(j - 1)]],
                     sep = " + ")

    hitter_simple_fd[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = hitter_data,
                                                        model = "fd",
                                                        index = c("id", "Anio_ref"))

    hitter_results_simple_fd[[j]][[i]] <- coeftest(hitter_simple_fd[[i + hitter_stat_num*(j - 1)]],
                                                        vcov = vcovHC(hitter_simple_fd[[i + hitter_stat_
                                                                      type = "HC1",
                                                                      cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_fd[[j]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Primeras Diferencias",
          covariate.labels = hitter_stats[[j]])
}
```

```
Bateadores: Primeras Diferencias
===========================================================================
                                   Dependent variable:
               ------------------------------------------------------------

                  (1)       (2)       (3)       (4)        (5)       (6)
---------------------------------------------------------------------------
Edadt          -0.011*** -0.011*** -0.011*** -0.012***  -0.012*** -0.011***
                (0.002)   (0.002)   (0.002)   (0.002)    (0.002)   (0.002)
Años contratot -0.045*** -0.045*** -0.045*** -0.043***  -0.044*** -0.044***
                (0.009)   (0.009)   (0.009)   (0.009)    (0.009)   (0.009)
Eqipot         0.002***  0.002***  0.002***   0.002***  0.002***  0.002***
                (0.001)   (0.001)   (0.001)   (0.001)    (0.001)   (0.001)
XABt            -0.0001
               (0.0004)
XABt-1         0.001***
               (0.0003)
XAB2t                    -0.00002
                         (0.00001)
XAB2t-1                   0.00001
                         (0.00003)
XHt                                 -0.001*
```

	(1)	(2)	(3)	(4)	(5)	(6)
			(0.001)			
XHt-1			0.001			
			(0.001)			
XH2t				-0.0001***		
				(0.0001)		
XH2t-1				-0.0002*		
				(0.0001)		
XBAt					0.0001	
					(0.012)	
XBAt-1					0.039***	
					(0.010)	
XBA2t						-0.004
						(0.021)
XBA2t-1						0.030***
						(0.009)

Note: *p<0.1; **p<0.05; ***p<0.01

Bateadores: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.011***	-0.011***	-0.011***	-0.012***	-0.011***	-0.011***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Años contratot	-0.045***	-0.045***	-0.047***	-0.049***	-0.046***	-0.045***
	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)
Eqipot	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XDt	-0.002					
	(0.002)					
XDt-1	-0.001					
	(0.002)					
XD2t		0.0001				
		(0.0004)				
XD2t-1		-0.001				
		(0.0003)				
XHRt			0.006*			
			(0.004)			
XHRt-1			0.001			
			(0.002)			
XHR2t				0.001***		
				(0.0004)		
XHR2t-1				0.0002		
				(0.0003)		
XGSt					-0.001	
					(0.001)	
XGSt-1					0.002***	
					(0.001)	
XGS2t						-0.00003
						(0.0001)

XGS2t-1						0.00004
						(0.0001)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.012***	-0.011***	-0.011***	-0.012***	-0.011***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Años contratot	-0.044***	-0.043***	-0.045***	-0.046***	-0.044***	-0.044***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Eqipot	0.002***	0.002***	0.002***	0.002***	0.002***	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XOPSt	-0.007					
	(0.009)					
XOPSt-1	0.013*					
	(0.007)					
XOPS2t		-0.013				
		(0.008)				
XOPS2t-1		-0.005				
		(0.006)				
XOBPt			0.017			
			(0.022)			
XOBPt-1			0.049***			
			(0.015)			
XOBP2t				0.052**		
				(0.026)		
XOBP2t-1				0.029***		
				(0.010)		
XSLGt					-0.011	
					(0.012)	
XSLGt-1					-0.010	
					(0.014)	
XSLG2t						-0.010
						(0.014)
XSLG2t-1						-0.023*
						(0.014)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Bateadores: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)

```
Edadt          -0.011*** -0.012*** -0.009*** -0.011*** -0.014*** -0.012***
                (0.002)   (0.002)   (0.002)   (0.002)   (0.002)   (0.002)
Años contratot -0.046*** -0.045*** -0.045*** -0.044*** -0.051*** -0.050***
                (0.009)   (0.009)   (0.009)   (0.009)   (0.009)   (0.009)
Eqipot         0.002***  0.002***  0.002***  0.002***  0.002***  0.002***
                (0.001)   (0.001)   (0.001)   (0.001)   (0.001)   (0.001)
XRBIt           0.0004
                (0.001)
XRBIt-1          0.002
                (0.001)
XRBI2t                    0.0003
                         (0.0003)
XRBI2t-1                 -0.0002
                         (0.0001)
XTt                                -0.029***
                                    (0.007)
XTt-1                                0.002
                                    (0.009)
XT2t                                          -0.002
                                              (0.003)
XT2t-1                                        0.003**
                                              (0.001)
XWARt                                                   0.030***
                                                         (0.003)
XWARt-1                                                   0.004
                                                         (0.005)
XWAR2t                                                            0.014***
                                                                   (0.004)
XWAR2t-1                                                           0.0002
                                                                   (0.001)
==========================================================================
==========================================================================
Note:                                          *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```r
# Create a model to store the results
fielder_simple_fd <- list()

# To store the results
fielder_results_simple_fd_1 <- list()
fielder_results_simple_fd_2 <- list()
fielder_results_simple_fd_3 <- list()
fielder_results_simple_fd_4 <- list()
fielder_results_simple_fd_5 <- list()
fielder_results_simple_fd <- list(result_1 = fielder_results_simple_fd_1,
                                       result_2 = fielder_results_simple_fd_2,
                                       result_3 = fielder_results_simple_fd_3,
                                       result_4 = fielder_results_simple_fd_4,
                                       result_5 = fielder_results_simple_fd_5)

# Loop over the variables in var_hitter_list
```

```r
for (j in 1:fielder_rep){

  for (i in 1:fielder_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_fielder_t[[i + fielder_stat_num*(j - 1)]],
                          sep = '+')
    formula <- paste(base_vars_h,
                         stat_fielder_t_1[[i + fielder_stat_num*(j - 1)]],
                         sep = " + ")

    fielder_simple_fd[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = starting_data,
                                                          model = "fd",
                                                          index = c("id", "Anio_ref"))

    fielder_results_simple_fd[[j]][[i]] <- coeftest(fielder_simple_fd[[i + fielder_stat_num*(j - 1)]],
                                                   vcov = vcovHC(fielder_simple_fd[[i + fielder_s
                                                                 type = "HC1",
                                                                 cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_fd[[j]],
            no.space = TRUE,
            type = "text",
            title = "Lanzadores Iniciales: Primeras Diferencias",
            covariate.labels = fielder_stats[[j]])
}
```

```
Lanzadores Iniciales: Primeras Diferencias
============================================================================
                                    Dependent variable:
               -------------------------------------------------------------

                  (1)        (2)        (3)        (4)        (5)        (6)
----------------------------------------------------------------------------
Edadt           -0.019**  -0.018*** -0.019**   -0.017**  -0.015**  -0.016**
                (0.009)    (0.007)   (0.008)    (0.008)   (0.008)   (0.007)
Años contratot -0.025***  -0.043*** -0.035*** -0.033***  -0.033*** -0.036***
                (0.009)    (0.007)   (0.007)    (0.007)   (0.008)   (0.008)
Eqipot          0.002**   0.004***  0.003***   0.003***  0.003***  0.003***
                (0.001)    (0.001)   (0.001)    (0.001)   (0.001)   (0.001)
XH2t           -0.0003***
                (0.0001)
XH2t-1          0.00002
                (0.0001)
XHt                        0.003*
                           (0.001)
XHt-1                      0.0005
                           (0.001)
XR2t                                 -0.0002
                                    (0.0001)
XR2t-1                               0.00003
                                    (0.0001)
```

	(1)	(2)	(3)	(4)	(5)	(6)
XER2t				-0.0005***		
				(0.0002)		
XER2t-1				-0.00004		
				(0.0001)		
XERt					-0.001	
					(0.001)	
XERt-1					0.003***	
					(0.001)	
XRt						-0.0002
						(0.001)
XRt-1						0.003**
						(0.001)
Note:				*p<0.1; **p<0.05; ***p<0.01		

Lanzadores Iniciales: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.020**	-0.019**	-0.018**	-0.016**	-0.019***	-0.019***
	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Años contratot	-0.038***	-0.041***	-0.033***	-0.036***	-0.035***	-0.040***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Eqipot	0.004***	0.003***	0.004***	0.003***	0.004***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XComando2t	-0.002					
	(0.003)					
XComando2t-1	0.00001***					
	(0.00000)					
XComandot		0.017*				
		(0.009)				
XComandot-1		0.001***				
		(0.0003)				
XControl2t			-0.069***			
			(0.018)			
XControl2t-1			-0.026***			
			(0.005)			
ControlHt				0.009		
				(0.034)		
XControlt-1				-0.058***		
				(0.016)		
XDominio2t					-0.010***	
					(0.003)	
XDominio2t-1					0.009***	
					(0.003)	
XDominiot						0.030***
						(0.006)
XDominiot-1						0.012**
						(0.005)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.016**	-0.014*	-0.017**	-0.015*	-0.020***	-0.018**
	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)
Años contratot	-0.033***	-0.035***	-0.029***	-0.029***	-0.034***	-0.033***
	(0.010)	(0.011)	(0.008)	(0.009)	(0.007)	(0.007)
Eqipot	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XERA2t	0.001					
	(0.002)					
XERA2t-1	-0.003					
	(0.003)					
XERAt		-0.003				
		(0.009)				
XERAt-1		-0.021***				
		(0.005)				
XIP2t			-0.0002***			
			(0.0001)			
XIP2t-1			0.00004			
			(0.0001)			
XIPt				-0.002**		
				(0.001)		
XIPt-1				0.002*		
				(0.001)		
XL2t					-0.003*	
					(0.002)	
XL2t-1					-0.00002	
					(0.001)	
XLt						-0.007
						(0.005)
XLt-1						-0.0005
						(0.003)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.019***	-0.018**	-0.018**	-0.017**	-0.018**	-0.017**
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Años contratot	-0.036***	-0.036***	-0.035***	-0.042***	-0.030***	-0.035***

	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)	(0.010)
Eqipot	0.003***	0.003***	0.004***	0.004***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XS2t	0.100***					
	(0.001)					
XS2t-1	0.020***					
	(0.006)					
XSt		0.074***				
		(0.007)				
XSt-1		-0.014				
		(0.022)				
XSO2t			-0.0001***			
			(0.00003)			
XSO2t-1			0.0003***			
			(0.0001)			
XSOt				0.001*		
				(0.0005)		
XSOt-1				0.002***		
				(0.001)		
XWAR2t					-0.002	
					(0.002)	
XWAR2t-1					-0.004***	
					(0.001)	
XWARt						-0.005
						(0.006)
XWARt-1						0.005
						(0.008)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Primeras Diferencias

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.013*	-0.014*	-0.017**	-0.015**	-0.018**	-0.015*
	(0.007)	(0.008)	(0.007)	(0.008)	(0.009)	(0.008)
Años contratot	-0.032***	-0.036***	-0.034***	-0.025***	-0.034***	-0.026***
	(0.009)	(0.009)	(0.008)	(0.008)	(0.010)	(0.009)
Eqipot	0.003***	0.004***	0.003***	0.004***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XWHIP2t	0.003					
	(0.004)					
XWHIP2t-1	-0.021***					
	(0.006)					
XWHIPt		-0.004				
		(0.007)				
XWHIPt-1		-0.034**				
		(0.013)				
XBB2t			-0.0002			
			(0.0002)			

```
XBB2t-1                                   0.0005**
                                          (0.0002)
XBBt                                                -0.005***
                                                     (0.001)
XBBt-1                                              0.004***
                                                     (0.001)
XW2t                                                           -0.001
                                                               (0.001)
XW2t-1                                                         0.0003
                                                               (0.001)
XWt                                                                      -0.010***
                                                                          (0.004)
XWt-1                                                                      0.003
                                                                          (0.003)
==========================================================================
==========================================================================
Note:                                              *p<0.1; **p<0.05; ***p<0.01
```

Estimaciones conjuntas

Lo que se hará ahora es volver a estimar los modelos anteriores, pero con todas las variables que fueron significativas para un nivel del %5.

Bateadores

Para los bateadores las variables significativas son:

```r
# Significant variables:
# Pooling:
hitter_vars_1 <- c("X_Bateos",
                   "X_Porcentaje_On_base_plus_slugging_2",
                    "X_Porcentaje_on_base",
                    "X_Porcentaje_on_base_2",
                    "X_Porcentaje_slugging_2",
                    "X_Runs_batted_in",
                    "X_Triples",
                    "X_WAR",
                    "X_WAR_2")
# Add suffix "_t" to each name
stat_hitter_t <- paste0(hitter_vars_1, "_t")
stat_hitter_t_1 <- paste0(hitter_vars_1, "_t_1")
# Lista
hitter_vars_1 <- c(paste(stat_hitter_t, collapse = " + "),
                   paste(stat_hitter_t_1, collapse = " + "))
# Within
hitter_vars_2 <- c("X_Bateos",
                   "X_Porcentaje_On_base_plus_slugging_2",
                   "X_Porcentaje_on_base",
                   "X_Porcentaje_on_base_2",
                    "X_Porcentaje_slugging_2",
                    "X_Runs_batted_in",
                    "X_Triples",
```

```
                    "X_WAR",
                    "X_WAR_2")
# Add suffix "_t" to each name
stat_hitter_t <- paste0(hitter_vars_2, "_t")
stat_hitter_t_1 <- paste0(hitter_vars_2, "_t_1")
# Lista
hitter_vars_2 <- c(paste(stat_hitter_t, collapse = " + "),
                   paste(stat_hitter_t_1, collapse = " + "))
# Random effects
hitter_vars_3 <- c("X_Porcentaje_On_base_plus_slugging_2",
                   "X_Triples",
                   "X_WAR",
                   "X_WAR_2")
# Add suffix "_t" to each name
stat_hitter_t <- paste0(hitter_vars_3, "_t")
stat_hitter_t_1 <- paste0(hitter_vars_3, "_t_1")
# Lista
hitter_vars_3 <- c(paste(stat_hitter_t, collapse = " + "),
                   paste(stat_hitter_t_1, collapse = " + "))
# First Differences
hitter_vars_4 <- c("X_At_bats",
                   "X_Bateos_2",
                   "X_Bateos",
                   "X_Bateos_promedio",
                   "X_Bateos_promedio_2",
                   "X_Home_runs",
                   "X_Home_runs_2",
                   "X_Juegos_iniciados",
                   "X_Porcentaje_On_base_plus_slugging",
                   "X_Porcentaje_on_base",
                   "X_Porcentaje_on_base_2",
                   "X_Runs_batted_in",
                   "X_Triples",
                   "X_Triples_2",
                   "X_WAR",
                   "X_WAR_2")
# Add suffix "_t" to each name
stat_hitter_t <- paste0(hitter_vars_4, "_t")
stat_hitter_t_1 <- paste0(hitter_vars_4, "_t_1")
# Lista
hitter_vars_4 <- c(paste(stat_hitter_t, collapse = " + "),
                   paste(stat_hitter_t_1, collapse = " + "))


# Pooling:
formula <- paste(vars_ms,
                 hitter_vars_1[[1]],
                 sep = " + ")
formula <- paste(formula,
                 hitter_vars_1[[2]],
                 sep = " + ")
# Create a model to store the results
hitter_stimation_1 <- plm(formula, data = hitter_data,
```

```
                          model = "pooling",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_1 <- coeftest(hitter_stimation_1,
                                       vcov = vcovHC(hitter_stimation_1,
                                                     type = "HC1",
                                                     cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 hitter_vars_2[[1]],
                 sep = " + ")
formula <- paste(formula,
                 hitter_vars_2[[2]],
                 sep = " + ")
# Create a model to store the results
hitter_stimation_2 <- plm(formula, data = hitter_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_2 <- coeftest(hitter_stimation_2,
                                       vcov = vcovHC(hitter_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 hitter_vars_3[[1]],
                 sep = " + ")
formula <- paste(formula,
                 hitter_vars_3[[2]],
                 sep = " + ")
# Create a model to store the results
hitter_stimation_3 <- plm(formula, data = hitter_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_3 <- coeftest(hitter_stimation_3,
                                       vcov = vcovHC(hitter_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 hitter_vars_4[[1]],
                 sep = " + ")
formula <- paste(formula,
                 hitter_vars_4[[2]],
                 sep = " + ")
# Create a model to store the results
hitter_stimation_4 <- plm(formula, data = hitter_data,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_4 <- coeftest(hitter_stimation_4,
                                       vcov = vcovHC(hitter_stimation_4,
```

```r
                                                    type = "HC1",
                                                    cluster = "group"))

# Modelos
hitter_models <- list(pooling = hitter_results_stimation_1,
                      within = hitter_results_stimation_2,
                      random = hitter_results_stimation_3,
                      fd = hitter_results_stimation_4)


# Print the third block of results
stargazer(hitter_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Bateadores: Comparación de los modelos",
         covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                              "$X_{AB_{t}}$", "$X_{H^{2}_{t}}$", "$X_{H_{t}}$",
                              "$X_{OPS^{2}_{t}}$",
                              "$X_{BA_{t}}$", "$X_{BA^{2}_{t}}$",
                              "$X_{HR_{t}}$", "$X_{HR^{2}_{t}}$",
                              "$X_{GS_{t}}$", "$X_{OPS_{t}}$",
                              "$X_{OBP_{t}}$", "$X_{OBP^{2}_{t}}$",
                              "$X_{SLG^{2}_{t}}$", "$X_{RBI_{t}}$",
                              "$X_{T_{t}}$","$X_{T^{2}_{t}}$",
                              "$X_{WAR_{t}}$", "$X_{WAR^{2}_{t}}$",
                              "$X_{AB_{t-1}}$", "$X_{H^{2}_{t-1}}$", "$X_{H_{t-1}}$",
                              "$X_{OPS^{2}_{t-1}}$",
                              "$X_{BA_{t-1}}$", "$X_{BA^{2}_{t-1}}$",
                              "$X_{HR_{t-1}}$", "$X_{HR^{2}_{t-1}}$",
                              "$X_{GS_{t-1}}$", "$X_{OPS_{t-1}}$",
                              "$X_{OBP_{t-1}}$", "$X_{OBP^{2}_{t-1}}$",
                              "$X_{SLG^{2}_{t-1}}$", "$X_{RBI_{t-1}}$",
                              "$X_{T_{t-1}}$","$X_{T^{2}_{t-1}}$",
                              "$X_{WAR_{t-1}}$", "$X_{WAR^{2}_{t-1}}$",
                              "Agente$_{t}$"),
         column.labels = c("Pooling", "Within",
                           "Random effects","First-Differences"))
```

```
Bateadores: Comparación de los modelos
==================================================================
                              Dependent variable:
               ---------------------------------------------------

               Pooling   Within   Random effects First-Differences
                 (1)       (2)         (3)              (4)
------------------------------------------------------------------
Edadt          -0.006**  -0.005      -0.006**        -0.012***
               (0.003)   (0.005)     (0.003)          (0.002)
Años contratot  -0.003  -0.042***     -0.006         -0.047***
               (0.005)   (0.014)     (0.005)          (0.010)
Eqipot          0.001     0.001       0.001          0.002***
               (0.001)   (0.001)     (0.001)          (0.001)
```

XABt				0.004***
				(0.001)
XH2t				-0.0001
				(0.0001)
XHt	-0.0002	-0.001		-0.003***
	(0.001)	(0.003)		(0.001)
XOPS2t	-0.007	-0.030	-0.017*	
	(0.023)	(0.033)	(0.010)	
XBAt				-0.026
				(0.025)
XBA2t				-0.024
				(0.028)
XHRt				0.005
				(0.005)
XHR2t				0.0002
				(0.001)
XGSt				-0.006***
				(0.002)
XOPSt				-0.042*
				(0.022)
XOBPt	-0.028	-0.017		0.076*
	(0.025)	(0.039)		(0.045)
XOBP2t	-0.017	0.077		0.081***
	(0.036)	(0.049)		(0.028)
XSLG2t	0.004	0.033		
	(0.036)	(0.035)		
XRBIt	-0.003	0.001		-0.0004
	(0.002)	(0.004)		(0.001)
XTt	-0.005	-0.015	-0.006	-0.061***
	(0.008)	(0.012)	(0.008)	(0.010)
XT2t				0.021***
				(0.005)
XWARt	0.017**	0.037***	0.019**	0.012***
	(0.008)	(0.013)	(0.007)	(0.005)
XWAR2t	-0.001	-0.002	-0.002	0.009**
	(0.004)	(0.010)	(0.004)	(0.005)
XABt-1				-0.001***
				(0.0004)
XH2t-1				-0.0004***
				(0.0001)
XHt-1	-0.001	-0.001		-0.001
	(0.002)	(0.002)		(0.002)
XOPS2t-1	0.015	-0.041	0.004	
	(0.022)	(0.025)	(0.010)	
XBAt-1				0.065***
				(0.024)
XBA2t-1				0.024
				(0.027)
XHRt-1				-0.006***
				(0.002)
XHR2t-1				0.0001
				(0.0004)
XGSt-1				0.005***
				(0.001)

```
XOPSt-1                                                 -0.059***
                                                         (0.017)
XOBPt-1           0.030    0.066*                        0.067**
                 (0.026)   (0.039)                       (0.027)
XOBP2t-1          -0.033    0.059                        -0.042
                 (0.029)   (0.047)                       (0.029)
XSLG2t-1          -0.005   -0.037
                 (0.028)   (0.028)
XRBIt-1           0.001     0.004                        0.004*
                 (0.003)   (0.003)                       (0.002)
XTt-1            0.012**    0.001       0.009*            0.005
                 (0.006)   (0.011)     (0.005)           (0.005)
XT2t-1                                                   -0.001
                                                         (0.001)
XWARt-1           0.010    -0.003       0.007            0.013**
                 (0.007)   (0.011)     (0.006)           (0.006)
XWAR2t-1          0.003    -0.001       0.002            -0.001
                 (0.002)   (0.003)     (0.002)           (0.002)
Agentet          0.166**               0.177**
                 (0.081)               (0.086)
====================================================================
====================================================================
Note:                                   *p<0.1; **p<0.05; ***p<0.01
```

Como se puede observar, no todas las variables son significativas de manera conjunta. Reducieremos la cantidad de variables en la estimación ya que muchas de estas están correlacionadas con otras dentro de la misma. Nos quedaremos con las que fueron significativas en el modelo anterior, además de las WAR puesto que son un tipo de PCA.

```r
# Significant variables:
# Pooling:
hitter_vars_1 <- c("X_Triples_t_1",
                    "X_WAR_t")
# Lista
hitter_vars_1 <- paste(hitter_vars_1, collapse = " + ")
# Within
hitter_vars_2 <- c("X_Porcentaje_on_base_t_1",
                   "X_WAR_t")
# Lista
hitter_vars_2 <- paste(hitter_vars_2, collapse = " + ")
# Random effects
hitter_vars_3 <- c("X_Porcentaje_On_base_plus_slugging_2_t",
                   "X_Triples_t_1",
                   "X_WAR_t")
# Lista
hitter_vars_3 <- paste(hitter_vars_3, collapse = " + ")
# First Differences
hitter_vars_4 <- c("X_At_bats_t","X_At_bats_t_1",
                   "X_Bateos_t",
                   "X_Bateos_2_t","X_Bateos_2_t_1",
                   "X_Juegos_iniciados_t","X_Juegos_iniciados_t_1",
                   "X_Porcentaje_On_base_plus_slugging_t","X_Porcentaje_On_base_plus_slugging_t_1",
                   "X_Porcentaje_on_base_t","X_Porcentaje_on_base_t_1",
                   "X_Porcentaje_on_base_2_t",
```

```r
                   "X_Triples_t", "X_Triples_2_t",
                   "X_WAR_t","X_WAR_t_1",
                   "X_WAR_2_t",
                   "X_Bateos_promedio_t_1",
                   "X_Home_runs_t_1",
                   "X_Runs_batted_in_t_1")
# Lista
hitter_vars_4 <- paste(hitter_vars_4, collapse = " + ")


# Pooling:
formula <- paste(vars_ms,
                 hitter_vars_1,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_1 <- plm(formula, data = hitter_data,
                          model = "pooling",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_1 <- coeftest(hitter_stimation_1,
                                       vcov = vcovHC(hitter_stimation_1,
                                                     type = "HC1",
                                                     cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 hitter_vars_2,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_2 <- plm(formula, data = hitter_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_2 <- coeftest(hitter_stimation_2,
                                       vcov = vcovHC(hitter_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 hitter_vars_3,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_3 <- plm(formula, data = hitter_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_3 <- coeftest(hitter_stimation_3,
                                       vcov = vcovHC(hitter_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 hitter_vars_4,
                 sep = " + ")
```

```r
# Create a model to store the results
hitter_stimation_4 <- plm(formula, data = hitter_data,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_4 <- coeftest(hitter_stimation_4,
                                       vcov = vcovHC(hitter_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Modelos
hitter_models <- list(pooling = hitter_results_stimation_1,
                      within = hitter_results_stimation_2,
                      random = hitter_results_stimation_3,
                      fd = hitter_results_stimation_4)


# Print the third block of results
stargazer(hitter_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Bateadores: Comparación de los modelos - Primer refinamiento",
         column.labels = c("Pooling", "Within",
                           "Random effects","First-Differences"))
```

```
Bateadores: Comparación de los modelos - Primer refinamiento
==========================================================================================
                                                     Dependent variable:
                                       ---------------------------------------------------

                                       Pooling   Within   Random effects First-Differences
                                         (1)      (2)          (3)              (4)
------------------------------------------------------------------------------------------
Edad_t                                 -0.006**  -0.006      -0.006**        -0.011***
                                       (0.003)  (0.005)      (0.003)          (0.002)
Anios_de_contrato_t                     -0.004  -0.038***     -0.006         -0.048***
                                       (0.004)  (0.012)      (0.004)          (0.009)
team_num_t                              0.001    0.001        0.001          0.002***
                                       (0.001)  (0.001)      (0.001)          (0.001)
X_Porcentaje_On_base_plus_slugging_2_t                        -0.017
                                                             (0.010)
X_Triples_t_1                           0.010*                0.009
                                       (0.005)               (0.005)
X_At_bats_t                                                                  0.004***
                                                                              (0.001)
X_At_bats_t_1                                                                -0.001***
                                                                             (0.0004)
X_Bateos_t                                                                   -0.002**
                                                                              (0.001)
X_Bateos_2_t                                                                  -0.0001
                                                                             (0.0001)
X_Bateos_2_t_1                                                              -0.0004***
```

				(0.0001)
X_Juegos_iniciados_t				-0.005***
				(0.002)
X_Juegos_iniciados_t_1				0.006***
				(0.001)
X_Porcentaje_On_base_plus_slugging_t				-0.047*
				(0.027)
X_Porcentaje_On_base_plus_slugging_t_1				-0.054***
				(0.015)
X_Porcentaje_on_base_t				0.066
				(0.043)
X_Porcentaje_on_base_t_1		0.033		0.079***
		(0.028)		(0.026)
X_Porcentaje_on_base_2_t				0.066***
				(0.014)
X_Triples_t				-0.064***
				(0.010)
X_Triples_2_t				0.023***
				(0.005)
X_WAR_t	0.016**	0.036***	0.018***	0.013***
	(0.007)	(0.009)	(0.006)	(0.005)
X_WAR_t_1				0.010**
				(0.005)
X_WAR_2_t				0.011**
				(0.004)
X_Bateos_promedio_t_1				0.031
				(0.021)
X_Home_runs_t_1				-0.007***
				(0.002)
X_Runs_batted_in_t_1				0.004**
				(0.002)
Constant	0.187**		0.170**	
	(0.081)		(0.085)	

```
==========================================================================================
==========================================================================================
Note:                                                           *p<0.1; **p<0.05; ***p<0.01
```

```r
# Significant variables:
# Pooling:
hitter_vars_1 <- c("X_Triples_t_1",
                    "X_WAR_t")
# Lista
hitter_vars_1 <- paste(hitter_vars_1, collapse = " + ")

# Within
hitter_vars_2 <- c("X_WAR_t")

# Random effects
hitter_vars_3 <- c("X_WAR_t")

# First Difference
hitter_vars_4 <- c("X_At_bats_t","X_At_bats_t_1",
                   "X_Bateos_t",
                   "X_Bateos_2_t_1",
```

```
                   "X_Juegos_iniciados_t","X_Juegos_iniciados_t_1",
                   "X_Porcentaje_On_base_plus_slugging_t","X_Porcentaje_On_base_plus_slugging_t_1",
                   "X_Porcentaje_on_base_t_1",
                   "X_Porcentaje_on_base_2_t",
                   "X_Triples_t", "X_Triples_2_t",
                   "X_WAR_t","X_WAR_t_1",
                   "X_WAR_2_t",
                   "X_Home_runs_t_1",
                   "X_Runs_batted_in_t_1")
# Lista
hitter_vars_4 <- paste(hitter_vars_4, collapse = " + ")


# Pooling:
formula <- paste(vars_ms,
                 hitter_vars_1,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_1 <- plm(formula, data = hitter_data,
                          model = "pooling",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_1 <- coeftest(hitter_stimation_1,
                                       vcov = vcovHC(hitter_stimation_1,
                                                     type = "HC1",
                                                     cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 hitter_vars_2,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_2 <- plm(formula, data = hitter_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_2 <- coeftest(hitter_stimation_2,
                                       vcov = vcovHC(hitter_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 hitter_vars_3,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_3 <- plm(formula, data = hitter_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_3 <- coeftest(hitter_stimation_3,
                                       vcov = vcovHC(hitter_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
```

```r
formula <- paste(vars_fe,
                 hitter_vars_4,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_4 <- plm(formula, data = hitter_data,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_4 <- coeftest(hitter_stimation_4,
                                       vcov = vcovHC(hitter_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Modelos
hitter_models <- list(pooling = hitter_results_stimation_1,
                      within = hitter_results_stimation_2,
                      random = hitter_results_stimation_3,
                      fd = hitter_results_stimation_4)


# Print the third block of results
stargazer(hitter_models,
          no.space = TRUE,
          align = TRUE,
          type = "text",
          title = "Bateadores: Comparación de los modelos - Segundo refinamiento",
          column.labels = c("Pooling", "Within",
                            "Random effects","First-Differences"))
```

```

Bateadores: Comparación de los modelos - Segundo refinamiento
==========================================================================================
                                                Dependent variable:
                                       ---------------------------------------------------

                                       Pooling   Within   Random effects First-Differences
                                         (1)       (2)         (3)              (4)
------------------------------------------------------------------------------------------
Edad_t                                 -0.006**  -0.006      -0.006**         -0.011***
                                       (0.003)   (0.004)     (0.003)           (0.002)
Anios_de_contrato_t                     -0.004  -0.039***    -0.007*          -0.050***
                                       (0.004)   (0.012)     (0.004)           (0.009)
team_num_t                              0.001     0.001       0.001           0.002***
                                       (0.001)   (0.001)     (0.001)           (0.001)
X_Triples_t_1                           0.010*
                                       (0.005)
X_At_bats_t                                                                   0.004***
                                                                               (0.001)
X_At_bats_t_1                                                                -0.002***
                                                                              (0.0003)
X_Bateos_t                                                                   -0.003***
                                                                               (0.001)
X_Bateos_2_t_1                                                              -0.0005***
                                                                              (0.0001)
```

```
X_Juegos_iniciados_t                                                   -0.005***
                                                                        (0.002)
X_Juegos_iniciados_t_1                                                 0.006***
                                                                        (0.001)
X_Porcentaje_On_base_plus_slugging_t                                    -0.017
                                                                        (0.010)
X_Porcentaje_On_base_plus_slugging_t_1                                 -0.049***
                                                                        (0.014)
X_Porcentaje_on_base_t_1                                               0.107***
                                                                        (0.014)
X_Porcentaje_on_base_2_t                                               0.081***
                                                                        (0.026)
X_Triples_t                                                            -0.064***
                                                                        (0.009)
X_Triples_2_t                                                          0.024***
                                                                        (0.005)
X_WAR_t                               0.016**  0.035***    0.019***    0.014***
                                      (0.007)   (0.009)    (0.006)      (0.005)
X_WAR_t_1                                                               0.008*
                                                                        (0.004)
X_WAR_2_t                                                               0.010**
                                                                        (0.005)
X_Home_runs_t_1                                                        -0.006***
                                                                        (0.002)
X_Runs_batted_in_t_1                                                    0.004**
                                                                        (0.002)
Constant                              0.187**              0.181**
                                      (0.081)              (0.082)
=========================================================================================
=========================================================================================
Note:                                                            *p<0.1; **p<0.05; ***p<0.01
```

```r
# Significant variables:
# Pooling:
hitter_vars_1 <- c("X_Triples_t_1",
                    "X_WAR_t")
# Lista
hitter_vars_1 <- paste(hitter_vars_1, collapse = " + ")

# Within
hitter_vars_2 <- c("X_WAR_t")

# Random effects
hitter_vars_3 <- c("X_WAR_t")

# First Differences
hitter_vars_4 <- c("X_At_bats_t","X_At_bats_t_1",
                   "X_Bateos_t",
                   "X_Bateos_2_t_1",
                   "X_Juegos_iniciados_t","X_Juegos_iniciados_t_1",
                   "X_Porcentaje_On_base_plus_slugging_t_1",
                   "X_Porcentaje_on_base_t_1",
                   "X_Porcentaje_on_base_2_t",
                   "X_Triples_t", "X_Triples_2_t",
```

```
                   "X_WAR_t","X_WAR_t_1",
                   "X_WAR_2_t",
                   "X_Home_runs_t_1",
                   "X_Runs_batted_in_t_1")
# Lista
hitter_vars_4 <- paste(hitter_vars_4, collapse = " + ")


# Pooling:
formula <- paste(vars_ms,
                 hitter_vars_1,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_1 <- plm(formula, data = hitter_data,
                          model = "pooling",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_1 <- coeftest(hitter_stimation_1,
                                       vcov = vcovHC(hitter_stimation_1,
                                                     type = "HC1",
                                                     cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 hitter_vars_2,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_2 <- plm(formula, data = hitter_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_2 <- coeftest(hitter_stimation_2,
                                       vcov = vcovHC(hitter_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 hitter_vars_3,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_3 <- plm(formula, data = hitter_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_3 <- coeftest(hitter_stimation_3,
                                       vcov = vcovHC(hitter_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 hitter_vars_4,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_4 <- plm(formula, data = hitter_data,
```

```r
                            model = "fd",
                            index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_4 <- coeftest(hitter_stimation_4,
                                       vcov = vcovHC(hitter_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Modelos
hitter_models <- list(pooling = hitter_results_stimation_1,
                      within = hitter_results_stimation_2,
                      random = hitter_results_stimation_3,
                      fd = hitter_results_stimation_4)
# List to store results
hitter_end_models <- list(pooling = hitter_stimation_1,
                          within = hitter_stimation_2,
                          random = hitter_stimation_3,
                          fd = hitter_stimation_4)

# Print the third block of results
stargazer(hitter_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Bateadores: Comparación de los modelos - Econométrico final",
         column.labels = c("Pooling", "Within",
                           "Random effects","First-Differences"))
```

```
Bateadores: Comparación de los modelos - Econométrico final
==========================================================================================
                                                 Dependent variable:
                                       ---------------------------------------------------

                                       Pooling   Within   Random effects First-Differences
                                         (1)       (2)         (3)              (4)
------------------------------------------------------------------------------------------
Edad_t                                 -0.006**  -0.006      -0.006**         -0.011***
                                       (0.003)   (0.004)     (0.003)           (0.002)
Anios_de_contrato_t                     -0.004  -0.039***    -0.007*          -0.050***
                                       (0.004)   (0.012)     (0.004)           (0.009)
team_num_t                              0.001     0.001       0.001           0.002***
                                       (0.001)   (0.001)     (0.001)           (0.001)
X_Triples_t_1                           0.010*
                                       (0.005)
X_At_bats_t                                                                   0.003***
                                                                               (0.001)
X_At_bats_t_1                                                                 -0.002***
                                                                              (0.0004)
X_Bateos_t                                                                    -0.003***
                                                                               (0.001)
X_Bateos_2_t_1                                                               -0.0005***
                                                                              (0.0001)
X_Juegos_iniciados_t                                                          -0.004**
```

```
                                                                                      (0.002)
X_Juegos_iniciados_t_1                                                               0.006***
                                                                                      (0.001)
X_Porcentaje_On_base_plus_slugging_t_1                                              -0.056***
                                                                                      (0.012)
X_Porcentaje_on_base_t_1                                                             0.113***
                                                                                      (0.012)
X_Porcentaje_on_base_2_t                                                             0.063***
                                                                                      (0.019)
X_Triples_t                                                                         -0.067***
                                                                                      (0.010)
X_Triples_2_t                                                                        0.025***
                                                                                      (0.005)
X_WAR_t                                0.016**  0.035***     0.019***                0.015***
                                       (0.007)   (0.009)     (0.006)                  (0.004)
X_WAR_t_1                                                                             0.008*
                                                                                      (0.005)
X_WAR_2_t                                                                             0.010**
                                                                                      (0.005)
X_Home_runs_t_1                                                                     -0.006***
                                                                                      (0.002)
X_Runs_batted_in_t_1                                                                  0.004**
                                                                                      (0.002)
Constant                               0.187**               0.181**
                                       (0.081)               (0.082)
==========================================================================================
==========================================================================================
Note:                                                              *p<0.1; **p<0.05; ***p<0.01
```

Aplicaremos un teest de Hausmann a cada pareja de modelos

```r
# create an empty list to store the test results
test_results <- list()

# loop through every possible pair of models
for (i in 1:(length(hitter_end_models)-1)) {
  for (j in (i+1):length(hitter_end_models)) {
    # apply phtest to the pair of models
    test_result <- phtest(hitter_end_models[[i]], hitter_end_models[[j]])
    # add the test result to the list
    test_results[[paste0(names(hitter_end_models[i]), "_vs_", names(hitter_end_models[j]))]] <- test_res
  }
}

# view the test results
test_results
```

```
$pooling_vs_within

    Hausman Test

data:  formula
chisq = 24.791, df = 4, p-value = 5.542e-05
```

```
alternative hypothesis: one model is inconsistent


$pooling_vs_random

    Hausman Test

data:  formula
chisq = 34.85, df = 4, p-value = 4.988e-07
alternative hypothesis: one model is inconsistent


$pooling_vs_fd

    Hausman Test

data:  formula
chisq = 29.901, df = 4, p-value = 5.128e-06
alternative hypothesis: one model is inconsistent


$within_vs_random

    Hausman Test

data:  formula
chisq = 19.316, df = 4, p-value = 0.0006812
alternative hypothesis: one model is inconsistent


$within_vs_fd

    Hausman Test

data:  formula
chisq = 19.74, df = 4, p-value = 0.0005619
alternative hypothesis: one model is inconsistent


$random_vs_fd

    Hausman Test

data:  formula
chisq = 26.893, df = 4, p-value = 2.089e-05
alternative hypothesis: one model is inconsistent
```

Se halló evidencia de un cambio estructural entre cualquiera de los modelos.

Lanzadores

```r
# Significant variables:
fielder_vars_1 <- c('X_Control_2',
                    'X_Control',
                    'X_Dominio_2',
                    'X_Dominio',
                    'X_ERA_2',
                    'X_ERA',
                    'X_Saves_2',
                    'X_Saves',
                    'X_WHIP_2',
                    'X_WHIP')
# Add suffix "_t" to each name
stat_fielder_t <- paste0(fielder_vars_1, "_t")
stat_fielder_t_1 <- paste0(fielder_vars_1, "_t_1")
# Lista
fielder_vars_1 <- c(paste(stat_fielder_t, collapse = " + "),
                   paste(stat_fielder_t_1, collapse = " + "))
# Within
fielder_vars_2 <- c('X_Carreras',
                    'X_Comando_2',
                    'X_ERA',
                    'X_Saves_2',
                    'X_Saves',
                    'X_Strike_outs_2',
                    'X_WAR_2')
# Add suffix "_t" to each name
stat_fielder_t <- paste0(fielder_vars_2, "_t")
stat_fielder_t_1 <- paste0(fielder_vars_2, "_t_1")
# Lista
fielder_vars_2 <- c(paste(stat_fielder_t, collapse = " + "),
                   paste(stat_fielder_t_1, collapse = " + "))
# Random effects
fielder_vars_3 <- c('X_Control_2',
                    'X_Control',
                    'X_Dominio_2',
                    'X_Dominio',
                    'X_ERA_2',
                    'X_ERA',
                    'X_Saves_2',
                    'X_Saves',
                    'X_WHIP_2',
                    'X_WHIP')
# Add suffix "_t" to each name
stat_fielder_t <- paste0(fielder_vars_3, "_t")
stat_fielder_t_1 <- paste0(fielder_vars_3, "_t_1")
# Lista
fielder_vars_3 <- c(paste(stat_fielder_t, collapse = " + "),
                   paste(stat_fielder_t_1, collapse = " + "))
# First Differences
fielder_vars_4 <- c('X_Bateos_2',
                    'X_Bateos',
                    'X_Carreras_ganadas_2',
                    'X_Carreras_ganadas',
```

```r
                     'X_ERA',
                     'X_Carreras',
                     'X_Comando_2',
                     'X_Comando',
                     'X_Control_2',
                     'X_Control',
                     'X_Dominio_2',
                     'X_Dominio',
                     'X_Inning_pitched_2',
                     'X_Inning_pitched',
                     'X_Losses_2',
                     'X_Saves_2',
                     'X_Saves',
                     'X_Strike_outs_2',
                     'X_Strike_outs',
                     'X_WAR_2',
                     'X_WHIP_2',
                     'X_WHIP',
                     'X_Walks_2',
                     'X_Walks',
                     'X_Wins')
# Add suffix "_t" to each name
stat_fielder_t <- paste0(fielder_vars_4, "_t")
stat_fielder_t_1 <- paste0(fielder_vars_4, "_t_1")
# Lista
fielder_vars_4 <- c(paste(stat_fielder_t, collapse = " + "),
                   paste(stat_fielder_t_1, collapse = " + "))


# Pooling:
formula <- paste(vars_ms,
                 fielder_vars_1[[1]],
                 sep = " + ")
formula <- paste(formula,
                 fielder_vars_1[[2]],
                 sep = " + ")
# Create a model to store the results
fielder_stimation_1 <- plm(formula, data = starting_data,
                          model = "pooling",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_1 <- coeftest(fielder_stimation_1,
                                       vcov = vcovHC(fielder_stimation_1,
                                                     type = "HC1",
                                                     cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 fielder_vars_2[[1]],
                 sep = " + ")
formula <- paste(formula,
                 fielder_vars_2[[2]],
                 sep = " + ")
# Create a model to store the results
```

```r
fielder_stimation_2 <- plm(formula, data = starting_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_2 <- coeftest(fielder_stimation_2,
                                       vcov = vcovHC(fielder_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 fielder_vars_3[[1]],
                 sep = " + ")
formula <- paste(formula,
                 fielder_vars_3[[2]],
                 sep = " + ")
# Create a model to store the results
fielder_stimation_3 <- plm(formula, data = starting_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_3 <- coeftest(fielder_stimation_3,
                                       vcov = vcovHC(fielder_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 fielder_vars_4[[1]],
                 sep = " + ")
formula <- paste(formula,
                 fielder_vars_4[[2]],
                 sep = " + ")
# Create a model to store the results
fielder_stimation_4 <- plm(formula, data = starting_data ,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_4 <- coeftest(fielder_stimation_4,
                                       vcov = vcovHC(fielder_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Models
fielder_models <- list(pooling = fielder_results_stimation_1,
                      within = fielder_results_stimation_2,
                      random = fielder_results_stimation_3,
                      fd = fielder_results_stimation_4)

# Print the third block of results
stargazer(fielder_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Lanzadores Iniciales: Comparación de los modelos",
```

```
          column.labels = c("Pooling", "Within",
                            "Random effects","First-Differences"))
```

```
Lanzadores Iniciales: Comparación de los modelos
=============================================================================
                                          Dependent variable:
                         ----------------------------------------------------

                         Pooling   Within   Random effects First-Differences
                           (1)       (2)         (3)               (4)
-----------------------------------------------------------------------------
Edad_t                   -0.008**  -0.023*     -0.009**         -0.028***
                         (0.004)   (0.012)     (0.004)           (0.007)
Anios_de_contrato_t      -0.015*   -0.025      -0.015*          -0.042***
                         (0.009)   (0.023)     (0.009)           (0.013)
team_num_t               0.003**   0.005**     0.003**            0.001
                         (0.001)   (0.002)     (0.001)           (0.002)
X_Bateos_2_t                                                    0.001***
                                                                (0.0004)
X_Bateos_t                                                      0.023***
                                                                 (0.003)
X_Carreras_ganadas_2_t                                          -0.001***
                                                                (0.0004)
X_Carreras_ganadas_t                                              0.007
                                                                 (0.006)
X_Control_2_t            -0.181**              -0.176**          -0.051
                         (0.074)               (0.075)           (0.082)
X_Control_t               0.082*                0.076*           -0.011
                         (0.045)               (0.046)           (0.045)
X_Dominio_2_t             -0.045                -0.047          -0.194***
                         (0.029)               (0.030)           (0.050)
X_Dominio_t               0.008                 0.010           0.159***
                         (0.023)               (0.023)           (0.048)
X_ERA_2_t                 0.001                 0.001
                         (0.003)               (0.003)
X_Inning_pitched_2_t                                            -0.001***
                                                                (0.0003)
X_Inning_pitched_t                                              -0.008**
                                                                 (0.003)
X_Losses_2_t                                                     -0.003
                                                                 (0.002)
X_Carreras_t                         0.003                      -0.037***
                                   (0.003)                       (0.009)
X_Comando_2_t                      -0.005                        -0.014
                                   (0.008)                       (0.009)
X_Comando_t                                                     0.036***
                                                                 (0.013)
X_ERA_t                  -0.017*   0.0004      -0.016*          -0.066***
                         (0.009)   (0.013)     (0.009)           (0.015)
X_Saves_2_t               -0.253   -1.291*      -0.284          -4.154**
                         (0.874)   (0.708)     (0.864)           (1.822)
X_Saves_t                 0.261    0.975**      0.291            3.006**
                         (0.579)   (0.482)     (0.573)           (1.237)
```

X_WHIP_2_t	0.006		0.007	0.114***
	(0.020)		(0.020)	(0.021)
X_WHIP_t	0.005		0.004	0.031
	(0.020)		(0.019)	(0.020)
X_Walks_2_t				0.001**
				(0.0005)
X_Walks_t				0.013**
				(0.006)
X_Wins_t				-0.008
				(0.012)
X_Bateos_2_t_1				-0.001**
				(0.0003)
X_Bateos_t_1				0.010
				(0.006)
X_Carreras_ganadas_2_t_1				0.001
				(0.0003)
X_Carreras_ganadas_t_1				0.007
				(0.007)
X_Control_2_t_1	-0.019		-0.021	-0.099***
	(0.036)		(0.037)	(0.035)
X_Control_t_1	-0.027		-0.028	-0.039
	(0.037)		(0.037)	(0.025)
X_Dominio_2_t_1	0.009		0.008	-0.131***
	(0.037)		(0.037)	(0.027)
X_Dominio_t_1	0.044*		0.041*	0.048**
	(0.024)		(0.024)	(0.022)
X_ERA_2_t_1	0.006		0.005	
	(0.005)		(0.004)	
X_Inning_pitched_2_t_1				0.0002
				(0.0003)
X_Inning_pitched_t_1				-0.011***
				(0.002)
X_Losses_2_t_1				-0.007***
				(0.002)
X_Strike_outs_2_t		-0.0001		0.0001
		(0.0001)		(0.0001)
X_Strike_outs_t				0.011***
				(0.003)
X_WAR_2_t		0.002		-0.002
		(0.004)		(0.005)
X_Carreras_t_1		-0.002		0.003
		(0.003)		(0.003)
X_Comando_2_t_1		0.00001		0.0004***
		(0.00000)		(0.0001)
X_Comando_t_1				-0.054***
				(0.012)
X_ERA_t_1	-0.016*	-0.029**	-0.017*	-0.043***
	(0.009)	(0.012)	(0.009)	(0.009)
X_Saves_2_t_1	-0.217**	0.166*	-0.214**	0.046
	(0.106)	(0.097)	(0.104)	(0.148)
X_Saves_t_1	0.419**	-0.168	0.412**	0.116
	(0.182)	(0.163)	(0.179)	(0.280)
X_WHIP_2_t_1	-0.020		-0.017	0.010
	(0.021)		(0.021)	(0.029)

```
X_WHIP_t_1               -0.003                -0.004           0.003
                         (0.019)               (0.019)         (0.025)
X_Walks_2_t_1                                                   0.001
                                                              (0.0005)
X_Walks_t_1                                                    -0.010
                                                               (0.007)
X_Wins_t_1                                                     0.017**
                                                               (0.007)
X_Strike_outs_2_t_1                0.0003                     0.001***
                                  (0.0002)                    (0.0002)
X_Strike_outs_t_1                                              -0.010*
                                                               (0.005)
X_WAR_2_t_1                       -0.008**                   -0.021***
                                   (0.004)                     (0.003)
Constant                 0.251**               0.261**
                         (0.121)               (0.126)
============================================================================
============================================================================
Note:                                                *p<0.1; **p<0.05; ***p<0.01
```

Seguiremos el proceso análogo de refinamiento para cada modelo

```r
# Significant variables:
fielder_vars_1 <- c('X_Control_2_t',
                    'X_Control_t',
                    'X_Dominio_t_1',
                    'X_ERA_t_1',
                    'X_ERA_t',
                    'X_Saves_2_t_1',
                    'X_Saves_t_1')
# Lista
fielder_vars_1 <- paste(fielder_vars_1, collapse = " + ")
# Within
fielder_vars_2 <- c('X_ERA_t_1',
                    'X_Saves_2_t',
                    'X_Saves_2_t_1',
                    'X_Saves_t',
                    'X_WAR_2_t_1')
# Lista
fielder_vars_2 <- paste(fielder_vars_2, collapse = " + ")
# Random effects
fielder_vars_3 <- c('X_Control_2_t',
                    'X_Control_t',
                    'X_Dominio_t_1',
                    'X_ERA_t',
                    'X_ERA_t_1',
                    'X_Saves_2_t_1',
                    'X_Saves_t_1')
# Lista
fielder_vars_3 <- paste(fielder_vars_3, collapse = " + ")
# First Differences
fielder_vars_4 <- c('X_Bateos_2_t',
                    'X_Bateos_2_t_1',
                    'X_Bateos_t',
```

```r
                    'X_Carreras_ganadas_2_t',
                    'X_ERA_t',
                    'X_ERA_t_1',
                    'X_Carreras_t',
                    'X_Comando_2_t_1',
                    'X_Comando_t',
                    'X_Comando_t_1',
                    'X_Control_2_t_1',
                    'X_Control_t_1',
                    'X_Dominio_2_t',
                    'X_Dominio_t',
                    'X_Dominio_2_t_1',
                    'X_Dominio_t_1',
                    'X_Inning_pitched_2_t',
                    'X_Inning_pitched_t',
                    'X_Inning_pitched_t_1',
                    'X_Losses_2_t_1',
                    'X_Saves_2_t',
                    'X_Saves_t',
                    'X_Strike_outs_2_t_1',
                    'X_Strike_outs_t',
                    'X_Strike_outs_t_1',
                    'X_WAR_2_t_1',
                    'X_WHIP_2_t',
                    'X_Walks_2_t',
                    'X_Walks_t',
                    'X_Wins_t_1')
# Lista
fielder_vars_4 <- paste(fielder_vars_4, collapse = " + ")


# Pooling:
formula <- paste(vars_ms,
                 fielder_vars_1,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_1 <- plm(formula, data = starting_data,
                           model = "pooling",
                           index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_1 <- coeftest(fielder_stimation_1,
                                        vcov = vcovHC(fielder_stimation_1,
                                                      type = "HC1",
                                                      cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 fielder_vars_2,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_2 <- plm(formula, data = starting_data,
                           model = "within",
                           index = c("id", "Anio_ref"))
# To store the results
```

```r
fielder_results_stimation_2 <- coeftest(fielder_stimation_2,
                                       vcov = vcovHC(fielder_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 fielder_vars_3,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_3 <- plm(formula, data = starting_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_3 <- coeftest(fielder_stimation_3,
                                       vcov = vcovHC(fielder_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 fielder_vars_4,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_4 <- plm(formula, data = starting_data ,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_4 <- coeftest(fielder_stimation_4,
                                       vcov = vcovHC(fielder_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Modelos
fielder_models <- list(pooling = fielder_results_stimation_1,
                      within = fielder_results_stimation_2,
                      random = fielder_results_stimation_3,
                      fd = fielder_results_stimation_4)


# Print the third block of results
stargazer(fielder_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Lanzadores Iniciales: Comparación de los modelos - Primer refinamiento",
         column.labels = c("Pooling", "Within",
                           "Random effects","First-Differences"))
```

```
Lanzadores Iniciales: Comparación de los modelos - Primer refinamiento
===========================================================================
                                       Dependent variable:
                       ----------------------------------------------------


                        Pooling   Within   Random effects First-Differences
```

	(1)	(2)	(3)	(4)
Edad_t	-0.008**	-0.020*	-0.009**	-0.016***
	(0.004)	(0.012)	(0.004)	(0.005)
Anios_de_contrato_t	-0.013*	-0.017	-0.013*	-0.057***
	(0.007)	(0.020)	(0.007)	(0.012)
team_num_t	0.002	0.004	0.002	0.002
	(0.001)	(0.002)	(0.001)	(0.001)
X_Control_2_t	-0.157**		-0.148**	
	(0.071)		(0.071)	
X_Control_t	0.091**		0.084**	
	(0.041)		(0.041)	
X_Bateos_2_t				0.0005**
				(0.0002)
X_Bateos_2_t_1				-0.0004***
				(0.0001)
X_Bateos_t				0.020***
				(0.002)
X_Carreras_ganadas_2_t				-0.001***
				(0.0003)
X_Dominio_t_1	0.047***		0.043***	0.042***
	(0.014)		(0.014)	(0.009)
X_Inning_pitched_2_t				-0.001***
				(0.0001)
X_Inning_pitched_t				-0.001
				(0.002)
X_Inning_pitched_t_1				0.001
				(0.001)
X_Losses_2_t_1				-0.003***
				(0.001)
X_ERA_t_1	-0.019***	-0.034***	-0.019***	-0.035***
	(0.006)	(0.011)	(0.006)	(0.006)
X_Carreras_t				-0.023***
				(0.003)
X_Comando_2_t_1				0.0004***
				(0.0001)
X_Comando_t				0.047***
				(0.006)
X_Comando_t_1				-0.046***
				(0.006)
X_Control_2_t_1				-0.098***
				(0.014)
X_Control_t_1				-0.047**
				(0.020)
X_Dominio_2_t				-0.152***
				(0.012)
X_Dominio_t				0.136***
				(0.021)
X_Dominio_2_t_1				-0.084***
				(0.011)
X_ERA_t	-0.013**		-0.012**	-0.047***
	(0.006)		(0.006)	(0.007)
X_Saves_2_t		-1.883***		-2.416***
		(0.656)		(0.448)

```
X_Saves_2_t_1          -0.194**  0.066***     -0.170**
                        (0.090)   (0.019)      (0.083)
X_Saves_t_1             0.374**                0.332**
                        (0.159)                (0.145)
X_Saves_t                        1.447***                      1.745***
                                  (0.465)                       (0.294)
X_Strike_outs_2_t_1                                            0.001***
                                                               (0.0001)
X_Strike_outs_t                                                0.006***
                                                                (0.001)
X_Strike_outs_t_1                                              -0.006***
                                                                (0.002)
X_WAR_2_t_1                      -0.008**                      -0.017***
                                  (0.003)                       (0.002)
X_WHIP_2_t                                                     0.084***
                                                                (0.012)
X_Walks_2_t                                                    0.001***
                                                               (0.0002)
X_Walks_t                                                      0.007***
                                                                (0.002)
X_Wins_t_1                                                       0.004
                                                                (0.003)
Constant                0.257**                0.275**
                        (0.123)                (0.132)
===========================================================================
===========================================================================
Note:                                           *p<0.1; **p<0.05; ***p<0.01
```

```r
# Significant variables:
fielder_vars_1 <- c('X_Control_2_t',
                    'X_Control_t',
                    'X_Dominio_t_1',
                    'X_ERA_t_1',
                    'X_ERA_t',
                    'X_Saves_2_t_1',
                    'X_Saves_t_1')
# Lista
fielder_vars_1 <- paste(fielder_vars_1, collapse = " + ")
# Within
fielder_vars_2 <- c('X_ERA_t_1',
                    'X_Saves_2_t',
                    'X_Saves_2_t_1',
                    'X_Saves_t',
                    'X_WAR_2_t_1')
# Lista
fielder_vars_2 <- paste(fielder_vars_2, collapse = " + ")
# Random effects
fielder_vars_3 <- c('X_Control_2_t',
                    'X_Control_t',
                    'X_Dominio_t_1',
                    'X_ERA_t',
                    'X_ERA_t_1',
                    'X_Saves_2_t_1',
                    'X_Saves_t_1')
```

```r
# Lista
fielder_vars_3 <- paste(fielder_vars_3, collapse = " + ")
# First Differences
fielder_vars_4 <- c('X_Bateos_2_t',
                    'X_Bateos_2_t_1',
                    'X_Bateos_t',
                    'X_Carreras_ganadas_2_t',
                    'X_ERA_t',
                    'X_ERA_t_1',
                    'X_Carreras_t',
                    'X_Comando_2_t_1',
                    'X_Comando_t',
                    'X_Comando_t_1',
                    'X_Control_2_t_1',
                    'X_Control_t_1',
                    'X_Dominio_2_t',
                    'X_Dominio_t',
                    'X_Dominio_2_t_1',
                    'X_Dominio_t_1',
                    'X_Inning_pitched_2_t',
                    'X_Losses_2_t_1',
                    'X_Saves_2_t',
                    'X_Saves_t',
                    'X_Strike_outs_2_t_1',
                    'X_Strike_outs_t',
                    'X_Strike_outs_t_1',
                    'X_WAR_2_t_1',
                    'X_WHIP_2_t',
                    'X_Walks_2_t',
                    'X_Walks_t',
                    '-1')
# Lista
fielder_vars_4 <- paste(fielder_vars_4, collapse = " + ")


# Pooling:
formula <- paste(vars_ms,
                 fielder_vars_1,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_1 <- plm(formula, data = starting_data,
                           model = "pooling",
                           index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_1 <- coeftest(fielder_stimation_1,
                                        vcov = vcovHC(fielder_stimation_1,
                                                      type = "HC1",
                                                      cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 fielder_vars_2,
                 sep = " + ")
# Create a model to store the results
```

```
fielder_stimation_2 <- plm(formula, data = starting_data,
                          model = "within",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_2 <- coeftest(fielder_stimation_2,
                                       vcov = vcovHC(fielder_stimation_2,
                                                     type = "HC1",
                                                     cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 fielder_vars_3,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_3 <- plm(formula, data = starting_data,
                          model = "random",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_3 <- coeftest(fielder_stimation_3,
                                       vcov = vcovHC(fielder_stimation_3,
                                                     type = "HC1",
                                                     cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 fielder_vars_4,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_4 <- plm(formula, data = starting_data ,
                          model = "fd",
                          index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_4 <- coeftest(fielder_stimation_4,
                                       vcov = vcovHC(fielder_stimation_4,
                                                     type = "HC1",
                                                     cluster = "group"))

# Modelos
fielder_models <- list(pooling = fielder_results_stimation_1,
                      within = fielder_results_stimation_2,
                      random = fielder_results_stimation_3,
                      fd = fielder_results_stimation_4)
# List to store models:
fielder_end_models <- list(pooling = fielder_stimation_1,
                            within = fielder_stimation_2,
                            random = fielder_stimation_3,
                            fd = fielder_stimation_4)

# Print the third block of results
stargazer(fielder_models,
         no.space = TRUE,
         align = TRUE,
         type = "text",
         title = "Lanzadores Iniciales: Comparación de los modelos - Segundo refinamiento",
         column.labels = c("Pooling", "Within",
```

```
                          "Random effects","First-Differences"))
```

```
Lanzadores Iniciales: Comparación de los modelos - Segundo refinamiento
==========================================================================
                                       Dependent variable:
                      ----------------------------------------------------

                        Pooling   Within   Random effects First-Differences
                          (1)       (2)         (3)              (4)
--------------------------------------------------------------------------
Edad_t                 -0.008**   -0.020*     -0.009**          -0.016***
                        (0.004)   (0.012)     (0.004)            (0.004)
Anios_de_contrato_t     -0.013*   -0.017      -0.013*           -0.058***
                        (0.007)   (0.020)     (0.007)            (0.012)
team_num_t               0.002     0.004       0.002             0.002*
                        (0.001)   (0.002)     (0.001)            (0.001)
X_Control_2_t          -0.157**               -0.148**
                        (0.071)               (0.071)
X_Control_t             0.091**                0.084**
                        (0.041)               (0.041)
X_Bateos_2_t                                                    0.0005**
                                                                (0.0002)
X_Bateos_2_t_1                                                 -0.0004***
                                                                (0.0001)
X_Bateos_t                                                      0.020***
                                                                 (0.002)
X_Carreras_ganadas_2_t                                          -0.001***
                                                                (0.0003)
X_Dominio_t_1          0.047***                0.043***         0.042***
                        (0.014)                (0.014)           (0.009)
X_Inning_pitched_2_t                                            -0.001***
                                                                (0.0001)
X_Losses_2_t_1                                                  -0.003***
                                                                 (0.001)
X_ERA_t_1              -0.019*** -0.034***   -0.019***          -0.036***
                        (0.006)   (0.011)     (0.006)            (0.006)
X_Carreras_t                                                    -0.023***
                                                                 (0.003)
X_Comando_2_t_1                                                 0.0004***
                                                                (0.0001)
X_Comando_t                                                     0.048***
                                                                 (0.006)
X_Comando_t_1                                                   -0.046***
                                                                 (0.006)
X_Control_2_t_1                                                 -0.098***
                                                                 (0.013)
X_Control_t_1                                                   -0.053***
                                                                 (0.012)
X_Dominio_2_t                                                   -0.151***
                                                                 (0.011)
X_Dominio_t                                                     0.134***
                                                                 (0.020)
X_Dominio_2_t_1                                                 -0.084***
```

```
                                                          (0.011)
X_ERA_t                -0.013**            -0.012**     -0.046***
                        (0.006)             (0.006)      (0.007)
X_Saves_2_t                      -1.883***              -2.435***
                                  (0.656)                (0.439)
X_Saves_2_t_1          -0.194**  0.066***  -0.170**
                        (0.090)   (0.019)   (0.083)
X_Saves_t_1             0.374**             0.332**
                        (0.159)             (0.145)
X_Saves_t                        1.447***               1.770***
                                  (0.465)                (0.295)
X_Strike_outs_2_t_1                                     0.001***
                                                        (0.0001)
X_Strike_outs_t                                         0.005***
                                                         (0.001)
X_Strike_outs_t_1                                       -0.005***
                                                         (0.001)
X_WAR_2_t_1                      -0.008**               -0.017***
                                  (0.003)                (0.002)
X_WHIP_2_t                                              0.081***
                                                         (0.012)
X_Walks_2_t                                             0.001***
                                                        (0.0002)
X_Walks_t                                               0.006***
                                                         (0.002)
Constant                0.257**             0.275**
                        (0.123)             (0.132)
===========================================================================
===========================================================================
Note:                                         *p<0.1; **p<0.05; ***p<0.01
```

Aplicaremos un teest de Hausmann a cada pareja de modelos

```
# create an empty list to store the test results
test_results <- list()

# loop through every possible pair of models
for (i in 1:(length(fielder_end_models)-1)) {
  for (j in (i+1):length(fielder_end_models)) {
    # apply phtest to the pair of models
    test_result <- phtest(fielder_end_models[[i]], fielder_end_models[[j]])
    # add the test result to the list
    test_results[[paste0(names(fielder_end_models[i]), "_vs_", names(fielder_end_models[j]))]] <- test_r
  }
}

# view the test results
test_results
```

```
$pooling_vs_within

    Hausman Test
```

```
data:  formula
chisq = 4.2929, df = 5, p-value = 0.5081
alternative hypothesis: one model is inconsistent


$pooling_vs_random

    Hausman Test

data:  formula
chisq = 4.8623, df = 10, p-value = 0.9002
alternative hypothesis: one model is inconsistent


$pooling_vs_fd

    Hausman Test

data:  formula
chisq = 9.4283, df = 6, p-value = 0.1509
alternative hypothesis: one model is inconsistent


$within_vs_random

    Hausman Test

data:  formula
chisq = 4.4388, df = 5, p-value = 0.4881
alternative hypothesis: one model is inconsistent


$within_vs_fd

    Hausman Test

data:  formula
chisq = 101.17, df = 7, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


$random_vs_fd

    Hausman Test

data:  formula
chisq = 9.501, df = 6, p-value = 0.1473
alternative hypothesis: one model is inconsistent
```

Solo hay evidencia de un cambio estructural entre el estimador *within* y *fd*.

Cambio estructural para el 2020 - COVID-19

Estimaremos los mismos modelos refinados, pero omitiendo el año 2020 para evaluar si hay un cambio estructural

Bateadores

```
# Pooling:
formula <- paste(vars_ms,
                 hitter_vars_1,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_1_cov <- plm(formula, data = hitter_cov_data,
                              model = "pooling",
                              index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_1_cov <- coeftest(hitter_stimation_1,
                                           vcov = vcovHC(hitter_stimation_1,
                                                         type = "HC1",
                                                         cluster = "group"))
# Within:
formula <- paste(vars_ms,
                 hitter_vars_2,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_2_cov <- plm(formula, data = hitter_cov_data,
                              model = "within",
                              index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_2_cov <- coeftest(hitter_stimation_2,
                                           vcov = vcovHC(hitter_stimation_2,
                                                         type = "HC1",
                                                         cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 hitter_vars_3,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_3_cov <- plm(formula, data = hitter_cov_data,
                              model = "random",
                              index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_3_cov <- coeftest(hitter_stimation_3,
                                           vcov = vcovHC(hitter_stimation_3,
                                                         type = "HC1",
                                                         cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 hitter_vars_4,
                 sep = " + ")
# Create a model to store the results
hitter_stimation_4_cov <- plm(formula, data = hitter_cov_data,
```

```r
                              model = "fd",
                              index = c("id", "Anio_ref"))
# To store the results
hitter_results_stimation_4_cov <- coeftest(hitter_stimation_4,
                                           vcov = vcovHC(hitter_stimation_4,
                                                         type = "HC1",
                                                         cluster = "group"))

# Models:
hitter_models_cov <- list(pooling = hitter_results_stimation_1_cov,
                          within = hitter_results_stimation_2_cov,
                          random = hitter_results_stimation_3_cov,
                          fd = hitter_results_stimation_4_cov)
# Store models:
hitter_end_models_cov <- list(pooling = hitter_stimation_1_cov,
                              within = hitter_stimation_2_cov,
                              random = hitter_stimation_3_cov,
                              fd = hitter_stimation_4_cov)

# Print the third block of results
stargazer(hitter_models_cov,
          no.space = TRUE,
          align = TRUE,
          type = "text",
          title = "Bateadores: Comparación de los modelos - COVID-19",
          column.labels = c("Pooling", "Within",
                            "Random effects","First-Differences"),
          covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                              "$X_{T_{t-1}}$", "$X_{BA_{t-1}}$", "$X_{GS_{t-1}}$",
                              "$X_{OBP^{2}_{t}}$", "$X_{WAR_{t}}$", "$X_{WAR^{2}_{t}}$",
                              "Intercepto"))
```

```
Bateadores: Comparación de los modelos - COVID-19
==========================================================================================
                                                 Dependent variable:
                                       ---------------------------------------------------

                                       Pooling   Within   Random effects First-Differences
                                         (1)       (2)         (3)              (4)
------------------------------------------------------------------------------------------
Edadt                                  -0.006**  -0.006      -0.006**         -0.011***
                                       (0.003)   (0.004)     (0.003)           (0.002)
Años contratot                          -0.004  -0.039***    -0.007*          -0.050***
                                       (0.004)   (0.012)     (0.004)           (0.009)
Eqipot                                  0.001     0.001       0.001           0.002***
                                       (0.001)   (0.001)     (0.001)           (0.001)
XTt-1                                   0.010*
                                       (0.005)
XBAt-1                                                                        0.003***
                                                                               (0.001)
XGSt-1                                                                        -0.002***
                                                                              (0.0004)
XOBP2t                                                                        -0.003***
```

```
                                                                              (0.001)
XWARt                                                                       -0.0005***
                                                                             (0.0001)
XWAR2t                                                                       -0.004**
                                                                              (0.002)
Intercepto                                                                   0.006***
                                                                              (0.001)
X_Porcentaje_On_base_plus_slugging_t_1                                       -0.056***
                                                                              (0.012)
X_Porcentaje_on_base_t_1                                                     0.113***
                                                                              (0.012)
X_Porcentaje_on_base_2_t                                                     0.063***
                                                                              (0.019)
X_Triples_t                                                                  -0.067***
                                                                              (0.010)
X_Triples_2_t                                                                0.025***
                                                                              (0.005)
X_WAR_t                                0.016**  0.035***     0.019***        0.015***
                                       (0.007)   (0.009)     (0.006)          (0.004)
X_WAR_t_1                                                                     0.008*
                                                                              (0.005)
X_WAR_2_t                                                                     0.010**
                                                                              (0.005)
X_Home_runs_t_1                                                              -0.006***
                                                                              (0.002)
X_Runs_batted_in_t_1                                                          0.004**
                                                                              (0.002)
Constant                               0.187**               0.181**
                                       (0.081)               (0.082)
==========================================================================================
==========================================================================================
Note:                                                          *p<0.1; **p<0.05; ***p<0.01
```

Fildeadores

```
# Pooling:
formula <- paste(vars_ms,
                 fielder_vars_1,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_1_cov <- plm(formula, data = starting_cov_data,
                               model = "pooling",
                               index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_1_cov <- coeftest(fielder_stimation_1,
                                            vcov = vcovHC(fielder_stimation_1,
                                                          type = "HC1",
                                                          cluster = "group"))
# Within:
formula <- paste(vars_fe,
                 fielder_vars_2,
                 sep = " + ")
```

```r
# Create a model to store the results
fielder_stimation_2_cov <- plm(formula, data = starting_cov_data,
                               model = "within",
                               index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_2_cov <- coeftest(fielder_stimation_2,
                                            vcov = vcovHC(fielder_stimation_2,
                                                          type = "HC1",
                                                          cluster = "group"))
# Random:
formula <- paste(vars_ms,
                 fielder_vars_3,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_3_cov <- plm(formula, data = starting_cov_data,
                               model = "random",
                               index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_3_cov <- coeftest(fielder_stimation_3,
                                            vcov = vcovHC(fielder_stimation_3,
                                                          type = "HC1",
                                                          cluster = "group"))
# First Differences:
formula <- paste(vars_fe,
                 fielder_vars_4,
                 sep = " + ")
# Create a model to store the results
fielder_stimation_4_cov <- plm(formula, data = starting_cov_data,
                               model = "fd",
                               index = c("id", "Anio_ref"))
# To store the results
fielder_results_stimation_4_cov <- coeftest(fielder_stimation_4,
                                            vcov = vcovHC(fielder_stimation_4,
                                                          type = "HC1",
                                                          cluster = "group"))

# Modelos
fielder_models_cov <- list(pooling = fielder_results_stimation_1_cov,
                           within = fielder_results_stimation_2_cov,
                           random = fielder_results_stimation_3_cov,
                           fd = fielder_results_stimation_4_cov)
# Store model results:
fielder_end_models_cov <- list(pooling = fielder_stimation_1_cov,
                               within = fielder_stimation_2_cov,
                               random = fielder_stimation_3_cov,
                               fd = fielder_stimation_4_cov)

# Print the third block of results
stargazer(fielder_models_cov,
          no.space = TRUE,
          align = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: Comparación de los modelos - COVID-19",
```

```r
        column.labels = c("Pooling", "Within",
                          "Random effects","First-Differences"),
        covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "$X_{Control^{2}_{t}}$", "$X_{Control_{t}}$",
                             "$X_{Dominio_{t-1}}$", "$X_{H_{t}}$",
                             "$X_{ER^{2}_{t}}$","$X_{ERA_{t-1}}$","$X_{ERA_{t}}$",
                             "$X_{S_{t-1}}$","$X_{S^{2}_{t-1}}$","$X_{S_{t}}$",
                             "$X_{Comando^{2}_{t-1}}$","$X_{Comando_{t}}$",
                             "$X_{Dominio_{t}}$","$X_{L^{2}_{t-1}}$",
                             "$X_{SO^{2}_{t-1}}$","$X_{SO_{t}}$","$X_{BB_{t}}$",
                             "Intercepto"))
```

```
Lanzadores Iniciales: Comparación de los modelos - COVID-19
========================================================================
                                    Dependent variable:
                    ----------------------------------------------------

                     Pooling   Within   Random effects First-Differences
                       (1)       (2)         (3)              (4)
------------------------------------------------------------------------
Edadt               -0.008**   -0.020*     -0.009**        -0.016***
                     (0.004)   (0.012)     (0.004)          (0.004)
Años contratot       -0.013*   -0.017      -0.013*         -0.058***
                     (0.007)   (0.020)     (0.007)          (0.012)
Eqipot                0.002     0.004       0.002           0.002*
                     (0.001)   (0.002)     (0.001)          (0.001)
XControl2t          -0.157**               -0.148**
                     (0.071)               (0.071)
XControlt            0.091**               0.084**
                     (0.041)               (0.041)
XDominiot-1                                                0.0005**
                                                           (0.0002)
XHt                                                       -0.0004***
                                                           (0.0001)
XER2t                                                      0.020***
                                                            (0.002)
XERAt-1                                                    -0.001***
                                                           (0.0003)
XERAt               0.047***               0.043***        0.042***
                     (0.014)               (0.014)          (0.009)
XSt-1                                                      -0.001***
                                                           (0.0001)
XS2t-1                                                     -0.003***
                                                            (0.001)
XSt                 -0.019*** -0.034***   -0.019***        -0.036***
                     (0.006)   (0.011)     (0.006)          (0.006)
XComando2t-1                                               -0.023***
                                                            (0.003)
XComandot                                                  0.0004***
                                                           (0.0001)
XDominiot                                                  0.048***
                                                            (0.006)
XL2t-1                                                     -0.046***
```

```
                                                            (0.006)
XSO2t-1                                                    -0.098***
                                                            (0.013)
XSOt                                                       -0.053***
                                                            (0.012)
XBBt                                                       -0.151***
                                                            (0.011)
Intercepto                                                 0.134***
                                                            (0.020)
X_Dominio_2_t_1                                            -0.084***
                                                            (0.011)
X_ERA_t             -0.013**               -0.012**        -0.046***
                     (0.006)               (0.006)          (0.007)
X_Saves_2_t                   -1.883***                    -2.435***
                               (0.656)                      (0.439)
X_Saves_2_t_1       -0.194**  0.066***     -0.170**
                     (0.090)   (0.019)     (0.083)
X_Saves_t_1          0.374**               0.332**
                     (0.159)               (0.145)
X_Saves_t                     1.447***                     1.770***
                               (0.465)                      (0.295)
X_Strike_outs_2_t_1                                        0.001***
                                                           (0.0001)
X_Strike_outs_t                                            0.005***
                                                            (0.001)
X_Strike_outs_t_1                                          -0.005***
                                                            (0.001)
X_WAR_2_t_1                   -0.008**                     -0.017***
                               (0.003)                      (0.002)
X_WHIP_2_t                                                 0.081***
                                                            (0.012)
X_Walks_2_t                                                0.001***
                                                           (0.0002)
X_Walks_t                                                  0.006***
                                                            (0.002)
Constant             0.257**               0.275**
                     (0.123)               (0.132)
========================================================================
========================================================================
Note:                                        *p<0.1; **p<0.05; ***p<0.01
```

Procedamos a realizar el test de Hausman para cada modelo

```r
# List to store results
hitter_test_covid <- list()
model_names <- c("Pooling",
                 "Within",
                 "Random effects",
                 "First-Differences")

# Title:
print("Bateadores: Pruebas de Hausman para el COVID-19")
```

```
[1] "Bateadores: Pruebas de Hausman para el COVID-19"
```

```r
print("")
```

```
[1] ""
```

```r
# Loop for applying results
for (i in 1:4){
  hitter_test_covid[[i]] <- phtest(hitter_end_models[[i]],hitter_end_models_cov[[i]])
  print(model_names[[i]])
  print(hitter_test_covid[[i]])
}
```

```
[1] "Pooling"

	Hausman Test

data:  formula
chisq = 3.9513, df = 5, p-value = 0.5565
alternative hypothesis: one model is inconsistent

[1] "Within"

	Hausman Test

data:  formula
chisq = 3.0371, df = 4, p-value = 0.5516
alternative hypothesis: one model is inconsistent

[1] "Random effects"

	Hausman Test

data:  formula
chisq = 1.392, df = 4, p-value = 0.8456
alternative hypothesis: one model is inconsistent

[1] "First-Differences"

	Hausman Test

data:  formula
chisq = 15.506, df = 19, p-value = 0.6899
alternative hypothesis: one model is inconsistent
```

```r
# List to store results
fielder_test_covid <- list()
model_names <- c("Pooling",
                 "Within",
                 "Random effects",
                 "First-Differences")

# Title:
print("Lanzadores iniciales: Pruebas de Hausman para el COVID-19")
```

```
[1] "Lanzadores iniciales: Pruebas de Hausman para el COVID-19"
```

```
print("")
```

```
[1] ""
```

```
# Loop for applying results
for (i in 1:4){
  fielder_test_covid[[i]] <- phtest(fielder_end_models[[i]],
                                    fielder_end_models_cov[[i]])
  print(model_names[[i]])
  print(fielder_test_covid[[i]])
}
```

```
[1] "Pooling"

	Hausman Test

data:  formula
chisq = 6.6745, df = 10, p-value = 0.7558
alternative hypothesis: one model is inconsistent

[1] "Within"

	Hausman Test

data:  formula
chisq = 2.5947, df = 8, p-value = 0.9572
alternative hypothesis: one model is inconsistent

[1] "Random effects"

	Hausman Test

data:  formula
chisq = 6.2746, df = 10, p-value = 0.7917
alternative hypothesis: one model is inconsistent

[1] "First-Differences"

	Hausman Test

data:  formula
chisq = 12.337, df = 30, p-value = 0.9982
alternative hypothesis: one model is inconsistent
```

Vemos que solo hay un cambio estructural para el caso de los bateadores bajo el modelo de primeras diferencias.

PCA - Estimación directa

Lo que haremos ahore es obtener los estimadores con los componentes principales obtenidos en el tratamiento de los páneles, lo cuales ya son el número óptimo de componentes.

Pooling

Bateadores

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca1_t_1'

formula <- paste(vars_ms,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
hitter_simple_pooling_pca <- plm(formula, data = hitter_data,
                         model = "pooling",
                         index = c("id", "Anio_ref"))

# To store the results
hitter_results_simple_pooling_pca <- coeftest(hitter_simple_pooling_pca,
                                     vcov = vcovHC(hitter_simple_pooling_pca,
                                                   type = "HC1",
                                                   cluster = "group"))

# Print the third block of results
stargazer(hitter_results_simple_pooling_pca,
        no.space = TRUE,
        type = "text",
        title = "Bateadores: Modelo Pooling con PCA",
        covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Bateadores: Modelo Pooling con PCA
==========================================
               Dependent variable:
               ---------------------------

------------------------------------------
Edadt                   -0.006**
                         (0.003)
Años contratot           -0.001
                         (0.004)
Eqipot                    0.001
                         (0.001)
PCA1t                    0.00002
                        (0.00003)
PCA1t-1                 -0.00000
                        (0.00002)
Agentet                  0.157*
                         (0.081)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca2_t + pca1_t_1 + pca2_t_1'
formula <- paste(vars_ms,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
fielder_simple_pooling_pca <- plm(formula, data = starting_data,
                                  model = "pooling",
                                  index = c("id", "Anio_ref"))

# To store the results
fielder_results_simple_pooling_pca <- coeftest(fielder_simple_pooling_pca,
                                       vcov = vcovHC(fielder_simple_pooling_pca,
                                                     type = "HC1",
                                                     cluster = "group"))

# Print the third block of results
stargazer(fielder_results_simple_pooling_pca,
          no.space = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: Modelo Pooling con PCA",
          covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                               "PCA$_{1_{t}}$", "PCA$_{2_{t}}$", "PCA$_{1_{t-1}}$", "PCA$_{2_{t-1}}$",
                               "Agente$_{t}$"))
```

```
Lanzadores Iniciales: Modelo Pooling con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                      -0.008**
                            (0.004)
Años contratot              -0.006
                            (0.007)
Eqipot                      0.003*
                            (0.002)
PCA1t                       -0.002
                            (0.006)
PCA2t                       -0.0001
                           (0.0001)
PCA1t-1                     0.00001
                           (0.00001)
PCA2t-1                    -0.00000
                           (0.00005)
Agentet                     0.242*
                            (0.142)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Efectos fijos

Bateadores

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca1_t_1'
formula <- paste(vars_fe,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
hitter_simple_within_pca <- plm(formula, data = hitter_data,
                       model = "within",
                       index = c("id", "Anio_ref"))

# To store the results
hitter_results_simple_within_pca <- coeftest(hitter_simple_within_pca,
                                     vcov = vcovHC(hitter_simple_within_pca,
                                       type = "HC1",
                                       cluster = "group"))

# Print the third block of results
stargazer(hitter_results_simple_within_pca,
        no.space = TRUE,
        type = "text",
        title = "Bateadores: Estimador Within con PCA",
        covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Bateadores: Estimador Within con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                     -0.004
                          (0.006)
Años contratot           -0.032**
                          (0.012)
Eqipot                     0.001
                          (0.001)
PCA1t                    -0.00000
                         (0.00004)
PCA1t-1                  -0.00000
                         (0.00004)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca2_t + pca1_t_1 + pca2_t_1'
formula <- paste(vars_fe,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
fielder_simple_within_pca <- plm(formula, data = starting_data,
                                 model = "within",
                                 index = c("id", "Anio_ref"))

# To store the results
fielder_results_simple_within_pca <- coeftest(fielder_simple_within_pca,
                                              vcov = vcovHC(fielder_simple_within_pca,
                                                            type = "HC1",
                                                            cluster = "group"))


# Print the third block of results
stargazer(fielder_results_simple_within_pca,
        no.space = TRUE,
        type = "text",
        title = "Lanzadores Iniciales: Estimador Within con PCA",
        covariate.labels = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{2_{t}}$", "PCA$_{1_{t-1}}$", "PCA$_{2_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Lanzadores Iniciales: Estimador Within con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                       -0.030**
                             (0.015)
Años contratot               -0.025
                             (0.019)
Eqipot                        0.004
                             (0.002)
PCA1t                        -0.013
                             (0.008)
PCA2t                       -0.00001
                            (0.0001)
PCA1t-1                    -0.00001**
                            (0.00000)
PCA2t-1                      0.00001
                            (0.0001)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Efectos aleatorios

Bateadores

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca1_t_1'
formula <- paste(vars_ms,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
hitter_simple_random_pca <- plm(formula, data = hitter_data,
                               model = "random",
                               index = c("id", "Anio_ref"))

# To store the results
hitter_results_simple_random_pca <- coeftest(hitter_simple_random_pca,
                                        vcov = vcovHC(hitter_simple_random_pca,
                                                      type = "HC1",
                                                      cluster = "group"))

# Print the third block of results
stargazer(hitter_results_simple_random_pca,
        no.space = TRUE,
        type = "text",
        title = "Bateadores: Efectos Aleatorios con PCA",
        covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Bateadores: Efectos Aleatorios con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                   -0.005**
                         (0.003)
Años contratot           -0.003
                         (0.004)
Eqipot                    0.001
                         (0.001)
PCA1t                    0.00001
                        (0.00003)
PCA1t-1                 -0.00000
                        (0.00002)
Agentet                   0.148*
                         (0.083)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca2_t + pca1_t_1 + pca2_t_1'
formula <- paste(vars_ms,
                 pca_vars,
                 sep = " + ")

# Create a model to store the results
fielder_simple_random_pca <- plm(formula, data = starting_data,
                              model = "random",
                              index = c("id", "Anio_ref"))

# To store the results
fielder_results_simple_random_pca <- coeftest(fielder_simple_random_pca,
                                             vcov = vcovHC(fielder_simple_random_pca,
                                                           type = "HC1",
                                                           cluster = "group"))

# Print the third block of results
stargazer(fielder_results_simple_random_pca,
        no.space = TRUE,
        type = "text",
        title = "Lanzadores Iniciales: Efectos Aleatorios con PCA",
        covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{2_{t}}$", "PCA$_{1_{t-1}}$", "PCA$_{2_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Lanzadores Iniciales: Efectos Aleatorios con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                   -0.010**
                         (0.005)
Años contratot           -0.006
                         (0.007)
Eqipot                   0.003*
                         (0.001)
PCA1t                    -0.003
                         (0.006)
PCA2t                    -0.0001
                        (0.0001)
PCA1t-1                  0.00000
                        (0.00000)
PCA2t-1                 -0.00001
                        (0.00004)
Agentet                  0.310*
                         (0.173)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

First Differences

Bateadores

```r
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t+ pca1_t_1'
formula <- paste(vars_fe,
                 pca_vars,
                 sep = " + ")

hitter_simple_fd_pca <- plm(formula, data = hitter_data,
                            model = "fd",
                            index = c("id", "Anio_ref"))

# To store the results
hitter_results_simple_fd_pca <- coeftest(hitter_simple_fd_pca,
                                        vcov = vcovHC(hitter_simple_fd_pca,
                                                      type = "HC1",
                                                      cluster = "group"))

# Print the third block of results
stargazer(hitter_results_simple_fd_pca,
        no.space = TRUE,
        type = "text",
        title = "Bateadores: Primeras Diferencias con PCA",
        covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Bateadores: Primeras Diferencias con PCA
==========================================
                  Dependent variable:
               ---------------------------

------------------------------------------
Edadt                    -0.011***
                          (0.002)
Años contratot           -0.045***
                          (0.009)
Eqipot                   0.002***
                          (0.001)
PCA1t                     0.00002
                         (0.00001)
PCA1t-1                  -0.00000
                         (0.00002)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Starting pitcher

```
# run linear regression with grouped errors by country and robust errors
pca_vars <- 'pca1_t + pca2_t + pca1_t_1 + pca2_t_1'
formula <- paste(vars_fe,
                 pca_vars,
                 sep = " + ")

fielder_simple_fd_pca <- plm(formula, data = starting_data,
                              model = "fd",
                              index = c("id", "Anio_ref"))

# To store the results
fielder_results_simple_fd_pca <- coeftest(fielder_simple_fd_pca,
                                           vcov = vcovHC(fielder_simple_fd_pca,
                                                         type = "HC1",
                                                         cluster = "group"))

# Print the third block of results
stargazer(fielder_results_simple_fd_pca,
        no.space = TRUE,
        type = "text",
        title = "Lanzadores Iniciales: Primeras Diferencias con PCA",
        covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                             "PCA$_{1_{t}}$", "PCA$_{2_{t}}$", "PCA$_{1_{t-1}}$", "PCA$_{2_{t-1}}$",
                             "Agente$_{t}$"))
```

```
Lanzadores Iniciales: Primeras Diferencias con PCA
==========================================
                   Dependent variable:
               ---------------------------

------------------------------------------
Edadt                        -0.017*
                             (0.009)
Años contratot              -0.029***
                             (0.009)
Eqipot                      0.003***
                             (0.001)
PCA1t                        -0.001
                             (0.003)
PCA2t                      -0.0001***
                            (0.00003)
PCA1t-1                    -0.00001**
                            (0.00000)
PCA2t-1                      -0.0001
                            (0.00004)
==========================================
==========================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Mostremos los resultados de manera conjunta

```
hitter_pca_models <- list(hitter_simple_pooling_pca,
                       hitter_simple_within_pca,
                       hitter_simple_random_pca,
                       hitter_simple_fd_pca)

# Print the third block of results
stargazer(hitter_pca_models,
          no.space = TRUE,
          type = "text",
          title = "Bateadores regulares: Modelos con PCA",
          column.labels = c("Pooling", "Within",
                            "RE","FD"),
          covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                               "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                               "Agente$_{t}$"))
```

```
Bateadores regulares: Modelos con PCA
==========================================================================================
                                        Dependent variable:
               ---------------------------------------------------------------------------
                                      Y_Sueldo_regular_norm_t
                     Pooling                 Within          RE              FD
                       (1)                     (2)           (3)             (4)
------------------------------------------------------------------------------------------
Edadt              -0.006***                 -0.004       -0.005**         -0.011**
                    (0.002)                  (0.004)       (0.002)          (0.005)
Años contratot      -0.001                  -0.032***      -0.003          -0.045***
                    (0.004)                  (0.009)       (0.004)          (0.010)
Eqipot               0.001                    0.001         0.001            0.002*
                    (0.001)                  (0.001)       (0.001)          (0.001)
PCA1t               0.00002                  -0.00000      0.00001          0.00002
                   (0.00003)                (0.00004)     (0.00003)        (0.00004)
PCA1t-1             -0.00000                 -0.00000      -0.00000         -0.00000
                   (0.00002)                (0.00004)     (0.00002)        (0.00004)
Agentet             0.157**                                0.148**
                    (0.069)                                (0.072)
------------------------------------------------------------------------------------------
Observations          538                      538           538              225
R2                   0.018                    0.064         0.014            0.135
Adjusted R2          0.009                   -1.285         0.005            0.120
F Statistic    1.970* (df = 5; 532) 3.006** (df = 5; 220)  7.681   6.173*** (df = 5; 220)
==========================================================================================
Note:                                                         *p<0.1; **p<0.05; ***p<0.01
```

```
fielder_pca_models <- list(fielder_simple_pooling_pca,
                           fielder_simple_within_pca,
                           fielder_simple_random_pca,
                           fielder_simple_fd_pca)

# Print the third block of results
stargazer(fielder_pca_models,
          no.space = TRUE,
          type = "text",
```

```r
          title = "Lanzadores Iniciales: Modelos con PCA",
          column.labels = c("Pooling", "Within",
                            "RE","FD"),
          covariate.labels = c("Edad$_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                               "PCA$_{1_{t}}$", "PCA$_{1_{t-1}}$",
                               "Agente$_{t}$"))
```

```
Lanzadores Iniciales: Modelos con PCA
=================================================================================
                                       Dependent variable:
               ------------------------------------------------------------------
                                     Y_Sueldo_regular_norm_t
                     Pooling             Within           RE            FD
                       (1)                 (2)            (3)           (4)
---------------------------------------------------------------------------------
Edadt               -0.008**            -0.030***      -0.010**       -0.017
                     (0.004)             (0.011)        (0.004)       (0.014)
Años contratot       -0.006              -0.025         -0.006        -0.029
                     (0.009)             (0.020)        (0.009)       (0.020)
Eqipot               0.003*              0.004*         0.003*         0.003
                     (0.001)             (0.002)        (0.001)       (0.002)
PCA1t                -0.002              -0.013         -0.003        -0.001
                     (0.006)             (0.010)        (0.006)       (0.011)
PCA1t-1              -0.0001             -0.00001       -0.0001       -0.0001
                    (0.0001)             (0.0001)      (0.0001)       (0.0001)
Agentet              0.00001             -0.00001       0.00000       -0.00001
                    (0.00001)            (0.00002)     (0.00001)     (0.00002)
pca2_t_1            -0.00000             0.00001       -0.00001       -0.0001
                    (0.0001)             (0.0001)      (0.0001)       (0.0001)
Constant             0.242*                             0.310**
                     (0.125)                            (0.147)
---------------------------------------------------------------------------------
Observations           206                 206            206            88
R2                    0.058               0.130          0.058          0.081
Adjusted R2           0.025               -1.203         0.024          0.013
F Statistic    1.738 (df = 7; 198) 1.725 (df = 7; 81) 12.099*  1.168 (df = 7; 81)
=================================================================================
Note:                                                *p<0.1; **p<0.05; ***p<0.01
```

Comparación entre periodos

Obtendremos los estimadores para los primeros dos años de observación para luego compararlos con los estimadores para el resto de años. Primero, aseguremos que los páneles estén ordenados por nombre y año de referencia

```r
# Sort dataframe by player name and year_ref
hitter_data <- hitter_data %>% arrange(Jugador, Anio_ref)
# Sort dataframe by player name and year_ref
starting_data <- starting_data %>% arrange(Jugador, Anio_ref)
```

Haremos las estimaciones con todos los modelos para obtener un análisis robusto

Primeros dos años

Pooling

Bateadores

```
# To store models
hitter_model_pooling_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_hitter_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_h  <- paste(vars_ms, stat_hitter_t[[i]],
                    sep = '+')
  formula <- paste(base_vars_h,
                   stat_hitter_t_1[[i]],
                   sep = " + ")

  hitter_model_pooling_fa[[i]] <- plm(formula, data = hitter_first_two,
                                      model = "pooling",
                                      index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(hitter_model_pooling_fa[[i]],
                              vcov = vcovHC(hitter_model_pooling_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  h_m_pooled_f <- plm(formula, data = hitter_remaining,
                      model = "pooling",
                      index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(h_m_pooled_f,
                              vcov = vcovHC(h_m_pooled_f,
                                            type = "HC1",
                                            cluster = "group"))

  # To store models
  h_m_pooled <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(h_m_pooled,
            no.space = TRUE,
            type = "text",
            title = "Bateadores regulares: Efecto de la edad (Pooling)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = hitter_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(hitter_model_pooling_fa[[i]],h_m_pooled_f))
}
```

```
Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt              -0.011**         -0.006
                   (0.005)          (0.004)
Años contratot      0.0003          -0.004
                   (0.010)          (0.026)
Eqipot              0.001            0.003*
                   (0.001)          (0.002)
XABt               -0.002            0.003
                   (0.001)          (0.002)
XABt-1             -0.001            0.0002
                   (0.001)          (0.002)
Agentet             0.320**          0.147
                   (0.145)          (0.151)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 291.74, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt              -0.011**         -0.007*
                   (0.005)          (0.004)
Años contratot     -0.001           -0.006
                   (0.011)          (0.025)
Eqipot              0.0004           0.003
                   (0.001)          (0.002)
XAB2t              -0.0003           0.001*
                   (0.0002)         (0.0005)
XAB2t-1             0.0002          -0.0004
                   (0.0002)         (0.0003)
Agentet             0.302**          0.178
                   (0.153)          (0.131)
===============================================
```

```
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 38.797, df = 5, p-value = 2.609e-07
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**         -0.005
                    (0.005)        (0.004)
Años contratot      -0.001          -0.005
                    (0.010)        (0.026)
Eqipot               0.001           0.003*
                    (0.001)        (0.002)
XHt                -0.004**          0.004
                    (0.002)        (0.004)
XHt-1                0.001           0.001
                    (0.002)        (0.004)
Agentet             0.313**          0.136
                    (0.144)        (0.149)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 122.07, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**         -0.004
```

```
                    (0.005)         (0.003)
Años contratot      -0.003           0.001
                    (0.010)         (0.027)
Eqipot               0.001           0.003
                    (0.001)         (0.002)
XH2t                -0.038           -0.058
                    (0.033)         (0.054)
XH2t-1               0.024           0.052
                    (0.034)         (0.050)
Agentet             0.293*           0.085
                    (0.157)         (0.124)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 18.388, df = 5, p-value = 0.002498
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**          -0.003
                    (0.005)         (0.004)
Años contratot      -0.004           0.003
                    (0.010)         (0.028)
Eqipot               0.001           0.003
                    (0.001)         (0.002)
XBAt                -0.054           -0.098
                    (0.041)         (0.093)
XBAt-1               0.031           -0.021
                    (0.031)         (0.032)
Agentet             0.296*           0.029
                    (0.156)         (0.141)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.2366, df = 5, p-value = 0.2839
```

```
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**         -0.005
                   (0.005)         (0.003)
Años contratot      -0.004          -0.014
                    (0.010)        (0.026)
Eqipot              0.0005          0.003
                    (0.001)        (0.002)
XBA2t               -0.003          0.017
                    (0.006)        (0.011)
XBA2t-1              0.003         0.015**
                    (0.004)        (0.007)
Agentet             0.316**         0.141
                    (0.147)        (0.142)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 51.721, df = 5, p-value = 6.155e-10
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**         -0.004
                   (0.005)         (0.003)
Años contratot      -0.004          -0.009
                    (0.010)        (0.029)
Eqipot              0.0005          0.003
                    (0.001)        (0.002)
XDt                 -0.001          -0.003
                    (0.001)        (0.006)
XDt-1               0.0004         -0.002*
                    (0.001)        (0.001)
```

```
Agentet             0.320**          0.068
                    (0.147)         (0.138)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 23.4, df = 5, p-value = 0.000283
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.012**          -0.006
                    (0.005)         (0.004)
Años contratot     -0.001            -0.004
                    (0.010)         (0.027)
Eqipot              0.001            0.003
                    (0.001)         (0.002)
XD2t               -0.003*           0.004
                    (0.002)         (0.004)
XD2t-1             -0.001           -0.0001
                    (0.002)         (0.003)
Agentet             0.325**          0.139
                    (0.145)         (0.156)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 104.15, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
```

```
                    (1)             (2)
-----------------------------------------------
Edadt             -0.011**         -0.004
                   (0.005)        (0.004)
Años contratot     -0.003         -0.0005
                   (0.010)        (0.027)
Eqipot              0.001          0.003*
                   (0.001)        (0.002)
XHRt               -0.033          -0.006
                   (0.023)        (0.038)
XHRt-1              0.012          -0.026
                   (0.027)        (0.030)
Agentet            0.301*          0.071
                   (0.157)        (0.133)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 14.838, df = 5, p-value = 0.01108
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                    (1)             (2)
-----------------------------------------------
Edadt             -0.011**         -0.004
                   (0.005)        (0.003)
Años contratot     -0.004          0.002
                   (0.010)        (0.027)
Eqipot              0.001          0.003
                   (0.001)        (0.002)
XHR2t              -0.045          -0.078
                   (0.037)        (0.053)
XHR2t-1             0.023          0.042
                   (0.036)        (0.046)
Agentet            0.302*          0.082
                   (0.155)        (0.127)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 18.536, df = 5, p-value = 0.002345
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.010**         -0.003
                     (0.005)         (0.004)
Años contratot       -0.004           0.0005
                     (0.010)         (0.027)
Eqipot               0.0005           0.003
                     (0.001)         (0.002)
XGSt                 -0.061           -0.085
                     (0.038)         (0.072)
XGSt-1                0.024           -0.018
                     (0.037)         (0.042)
Agentet              0.289*           0.037
                     (0.151)         (0.139)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 20.184, df = 5, p-value = 0.001154
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.011**         -0.006
                     (0.005)         (0.004)
Años contratot       -0.0005          -0.013
                     (0.010)         (0.029)
Eqipot                0.001           0.003
                     (0.001)         (0.002)
XGS2t                -0.006**         0.008
```

```
                    (0.003)         (0.005)
XGS2t-1              0.001           0.003
                    (0.002)         (0.005)
Agentet             0.316**          0.170
                    (0.145)         (0.142)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 85.854, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011**         -0.004
                    (0.005)         (0.003)
Años contratot      -0.006           -0.001
                    (0.010)         (0.028)
Eqipot              0.0001           0.003
                    (0.001)         (0.002)
XOPSt               -0.019           -0.002
                    (0.013)         (0.041)
XOPSt-1             0.021**          -0.001
                    (0.008)         (0.040)
Agentet             0.310**          0.069
                    (0.146)         (0.138)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 14.274, df = 5, p-value = 0.01396
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
```

```
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.011**         -0.005
                    (0.005)         (0.004)
Años contratot      -0.004           0.002
                    (0.010)         (0.024)
Eqipot              0.0005           0.004*
                    (0.001)         (0.002)
XOPS2t              -0.004           0.024
                    (0.006)         (0.024)
XOPS2t-1             0.001           0.014
                    (0.001)         (0.016)
Agentet             0.308**          0.097
                    (0.149)         (0.134)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 26.818, df = 5, p-value = 6.189e-05
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.012***       -0.007**
                    (0.005)         (0.003)
Años contratot      -0.008           -0.022
                    (0.010)         (0.026)
Eqipot               0.001           0.003*
                    (0.001)         (0.002)
XOBPt               0.020*          0.061***
                    (0.011)         (0.021)
XOBPt-1             0.028***         0.012
                    (0.011)         (0.023)
Agentet             0.372**         0.224**
                    (0.145)         (0.109)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
```

```
[1] "Test para cambio estructural entre periodos:"

	Hausman Test

data:  formula
chisq = 28.192, df = 5, p-value = 3.339e-05
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.012***        -0.004
                    (0.004)         (0.003)
Años contratot      -0.001          -0.022
                    (0.010)         (0.025)
Eqipot              0.0002           0.004*
                    (0.001)         (0.002)
XOBP2t               0.008          0.054**
                    (0.006)         (0.026)
XOBP2t-1            0.011*          0.008**
                    (0.006)         (0.004)
Agentet             0.353**          0.125
                    (0.143)         (0.124)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

	Hausman Test

data:  formula
chisq = 43.473, df = 5, p-value = 2.963e-08
alternative hypothesis: one model is inconsistent
```

Starting pitcher

```r
# To store models
fielder_model_pooling_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_fielder_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_s  <- paste(vars_ms, stat_fielder_t[[i]],
                      sep = '+')
  formula <- paste(base_vars_s,
```

```
                   stat_fielder_t_1[[i]],
                   sep = " + ")

  fielder_model_pooling_fa[[i]] <- plm(formula, data = starting_first_two,
                                       model = "pooling",
                                       index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(fielder_model_pooling_fa[[i]],
                              vcov = vcovHC(fielder_model_pooling_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  s_m_pooled_f <- plm(formula, data = starting_remaining,
                      model = "pooling",
                      index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(s_m_pooled_f,
                              vcov = vcovHC(s_m_pooled_f,
                                            type = "HC1",
                                            cluster = "group"))
  # To store models
  s_m_pooled <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(s_m_pooled,
            no.space = TRUE,
            type = "text",
            title = "Lanzadores iniciales: Efecto de la edad (Pooling)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = fielder_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(fielder_model_pooling_fa[[i]],s_m_pooled_f))
}
```

```
Lanzadores iniciales: Efecto de la edad (Pooling)
================================================
                     Dependent variable:
               ---------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
------------------------------------------------
Edadt               -0.010          -0.011
                    (0.008)         (0.009)
Años contratot      -0.005          -0.043
                    (0.021)         (0.027)
Eqipot               0.003           0.007
                    (0.002)         (0.007)
XH2t                -0.0003          0.0003
                   (0.0002)        (0.0003)
```

```
XH2t-1              -0.0001         -0.0003
                   (0.0001)        (0.0003)
Agentet              0.287           0.245
                    (0.272)         (0.178)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.3622, df = 5, p-value = 0.3733
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.011           -0.010
                    (0.008)         (0.008)
Años contratot      -0.015           -0.041
                    (0.020)         (0.031)
Eqipot               0.003           0.005
                    (0.002)         (0.006)
XHt                 -0.002           0.001
                    (0.003)         (0.003)
XHt-1               0.0003           -0.002
                    (0.002)         (0.004)
Agentet              0.358           0.259
                    (0.264)         (0.163)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.9892, df = 5, p-value = 0.8506
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.012          -0.011
                     (0.009)         (0.009)
Años contratot       -0.016          -0.035
                     (0.020)         (0.031)
Eqipot                0.004           0.007
                     (0.002)         (0.007)
XR2t                 0.00001         0.001**
                    (0.0004)        (0.0004)
XR2t-1               -0.0003         -0.0005
                    (0.0002)         (0.001)
Agentet               0.378           0.248
                     (0.278)         (0.180)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.2456, df = 5, p-value = 0.5146
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.010          -0.010
                     (0.008)         (0.008)
Años contratot       -0.011          -0.037
                     (0.020)         (0.031)
Eqipot                0.003           0.005
                     (0.002)         (0.006)
XER2t                -0.005           0.005
                     (0.003)         (0.003)
XER2t-1              -0.0005         -0.002
                     (0.002)         (0.006)
Agentet               0.324           0.253
                     (0.264)         (0.180)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 8.3969, df = 5, p-value = 0.1357
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.010          -0.010
                    (0.008)         (0.007)
Años contratot      -0.019          -0.041
                    (0.019)         (0.033)
Eqipot               0.003           0.007
                    (0.002)         (0.006)
XERt                -0.018          -0.017
                    (0.012)         (0.017)
XERt-1             -0.028**         -0.004
                    (0.012)         (0.016)
Agentet              0.311           0.222
                    (0.246)         (0.164)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.526, df = 5, p-value = 0.6195
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.011          -0.010
                    (0.008)         (0.008)
Años contratot      -0.012          -0.037
                    (0.020)         (0.031)
Eqipot               0.003           0.005
```

```
                   (0.002)         (0.006)
XRt                -0.004           0.005
                   (0.003)         (0.003)
XRt-1              -0.001           -0.002
                   (0.003)         (0.006)
Agentet             0.342           0.255
                   (0.263)         (0.178)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 7.7693, df = 5, p-value = 0.1694
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                    Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.011           -0.005
                   (0.009)         (0.007)
Años contratot     -0.022          -0.062*
                   (0.019)         (0.033)
Eqipot              0.003           0.005
                   (0.002)         (0.005)
XComando2t          0.007         -0.064***
                   (0.009)         (0.020)
XComando2t-1     -0.00001**         0.027
                  (0.00000)        (0.017)
Agentet             0.361           0.100
                   (0.265)         (0.178)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 15.214, df = 5, p-value = 0.009487
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
```

```
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.011          -0.007
                    (0.009)        (0.008)
Años contratot      -0.018          -0.023
                    (0.019)        (0.031)
Eqipot               0.003          0.004
                    (0.002)        (0.007)
XComandot            0.006          -0.010
                    (0.019)        (0.046)
XComandot-1         -0.001*         -0.037
                    (0.001)        (0.046)
Agentet              0.361          0.119
                    (0.263)        (0.224)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.4502, df = 5, p-value = 0.6309
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.014*         -0.012
                    (0.008)        (0.007)
Años contratot      -0.014          -0.036
                    (0.019)        (0.033)
Eqipot              0.004**         0.009
                    (0.002)        (0.007)
XControl2t          -0.146*         0.325*
                    (0.081)        (0.184)
XControl2t-1       -0.142***        -0.396
                    (0.035)        (0.310)
Agentet              0.385          0.240
                    (0.254)        (0.159)
===============================================
===============================================
```

```
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 14.551, df = 5, p-value = 0.01246
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.011          -0.011
                    (0.007)        (0.007)
Años contratot      -0.022          -0.032
                    (0.020)        (0.033)
Eqipot               0.002          0.010
                    (0.002)        (0.006)
XControlt            0.059          0.194***
                    (0.055)        (0.061)
XControlt-1        -0.109***       -0.205**
                    (0.040)        (0.083)
Agentet              0.343          0.215
                    (0.239)        (0.203)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 12, df = 5, p-value = 0.03479
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.009          -0.008
                    (0.008)        (0.005)
```

```
Años contratot      -0.022          -0.032
                    (0.019)        (0.031)
Eqipot               0.003          0.008
                    (0.002)        (0.007)
XDominio2t           0.027          -0.069
                    (0.046)        (0.065)
XDominio2t-1       0.084***         0.072
                    (0.031)        (0.070)
Agentet              0.312          0.105
                    (0.245)        (0.149)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.7603, df = 5, p-value = 0.3302
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.007          -0.010
                    (0.008)        (0.007)
Años contratot      -0.021          -0.038
                    (0.019)        (0.028)
Eqipot               0.002          0.007
                    (0.002)        (0.007)
XDominiot            0.007          -0.043
                    (0.033)        (0.117)
XDominiot-1        0.090***         0.058
                    (0.029)        (0.109)
Agentet              0.266          0.227
                    (0.246)        (0.161)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.70579, df = 5, p-value = 0.9826
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.010          -0.011
                     (0.008)        (0.009)
Años contratot       -0.006          -0.039
                     (0.021)        (0.038)
Eqipot                0.004          0.007
                     (0.002)        (0.007)
XERA2t               -0.0003         0.0003
                    (0.0002)        (0.0003)
XERA2t-1             0.0001         -0.0001
                    (0.0001)        (0.0004)
Agentet               0.284          0.263
                     (0.271)        (0.192)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.2359, df = 5, p-value = 0.3878
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.011          -0.010
                     (0.009)        (0.007)
Años contratot       -0.014          -0.037
                     (0.021)        (0.030)
Eqipot                0.003          0.005
                     (0.002)        (0.006)
XERAt                -0.002          0.002
                     (0.002)        (0.003)
XERAt-1               0.001          -0.004
                     (0.002)        (0.004)
Agentet               0.348          0.257
```

```
                    (0.278)         (0.159)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.246, df = 5, p-value = 0.283
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.011          -0.012
                    (0.008)         (0.008)
Años contratot      -0.017          -0.040
                    (0.017)         (0.027)
Eqipot               0.003           0.007
                    (0.002)         (0.006)
XIP2t               -0.004*          0.009
                    (0.002)         (0.006)
XIP2t-1              0.001          -0.004
                    (0.002)         (0.005)
Agentet              0.343           0.296
                    (0.257)         (0.194)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 8.1094, df = 5, p-value = 0.1503
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
```

```
-----------------------------------------------
Edadt                -0.013          -0.009
                     (0.009)        (0.010)
Años contratot       -0.018          -0.035
                     (0.020)        (0.034)
Eqipot                0.004           0.006
                     (0.002)        (0.006)
XIPt                  0.241          -0.050
                     (0.154)        (0.129)
XIPt-1              0.038***         -0.218
                     (0.014)        (0.513)
Agentet               0.419           0.198
                     (0.275)        (0.285)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.7347, df = 5, p-value = 0.2411
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.014          -0.009
                     (0.008)        (0.010)
Años contratot       -0.018          -0.034
                     (0.020)        (0.034)
Eqipot               0.004*           0.006
                     (0.002)        (0.006)
XL2t                  0.121          -0.035
                     (0.102)        (0.086)
XL2t-1               0.097**         -0.118
                     (0.044)        (0.212)
Agentet               0.425           0.176
                     (0.272)        (0.293)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 3.6711, df = 5, p-value = 0.5977
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.012          -0.010
                     (0.008)         (0.009)
Años contratot       -0.020          -0.045
                     (0.018)         (0.040)
Eqipot                0.004           0.007
                     (0.002)         (0.007)
XDLt                 -0.0002          0.0003
                    (0.0001)        (0.0003)
XLt-1               0.0004**          0.0001
                    (0.0002)        (0.0003)
Agentet               0.383           0.246
                     (0.250)         (0.190)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.469, df = 5, p-value = 0.3614
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.012          -0.011
                     (0.008)         (0.008)
Años contratot       -0.021          -0.040
                     (0.020)         (0.039)
Eqipot                0.004           0.006
                     (0.002)         (0.007)
XS2t                -0.00001          0.001
                     (0.002)         (0.003)
```

```
XS2t-1              0.001         -0.0004
                   (0.002)        (0.004)
Agentet             0.386          0.265
                   (0.265)        (0.170)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.0286, df = 5, p-value = 0.8452
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt              -0.013          -0.009
                   (0.008)        (0.007)
Años contratot     -0.022          0.014
                   (0.019)        (0.050)
Eqipot              0.003          0.007
                   (0.002)        (0.007)
XSt                0.0003          0.028*
                   (0.006)        (0.014)
XSt-1              0.011**        -0.015*
                   (0.005)        (0.008)
Agentet            0.440*          0.150
                   (0.260)        (0.141)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 25.4, df = 5, p-value = 0.0001166
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.009          -0.009
                     (0.007)         (0.006)
Años contratot       -0.020          -0.038
                     (0.021)         (0.034)
Eqipot                0.003           0.007
                     (0.002)         (0.008)
XSO2t                -0.016           0.017
                     (0.019)         (0.027)
XSO2t-1             -0.054***        -0.043
                     (0.017)         (0.042)
Agentet               0.249           0.194
                     (0.240)         (0.149)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.6179, df = 5, p-value = 0.4643
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.011          -0.010
                     (0.007)         (0.007)
Años contratot       -0.026          -0.042
                     (0.021)         (0.031)
Eqipot               0.004*           0.007
                     (0.002)         (0.008)
XSOt                 -0.011          -0.012
                     (0.018)         (0.033)
XSOt-1              -0.051***        -0.035
                     (0.018)         (0.032)
Agentet               0.356           0.231
                     (0.241)         (0.164)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 2.2259, df = 5, p-value = 0.8171
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.012          -0.010
                    (0.008)         (0.008)
Años contratot      -0.016          -0.042
                    (0.019)         (0.034)
Eqipot               0.004           0.008
                    (0.002)         (0.006)
XWAR2t              -0.0004          0.001
                   (0.0005)         (0.001)
XWAR2t-1             0.0001          0.0004
                   (0.0005)         (0.001)
Agentet              0.379           0.235
                    (0.264)         (0.188)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.2365, df = 5, p-value = 0.5159
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.013          -0.012
                    (0.009)         (0.008)
Años contratot      -0.017          -0.054
                    (0.021)         (0.042)
Eqipot               0.004           0.008
```

```
                    (0.002)         (0.006)
XWARt               -0.0002          0.009*
                    (0.005)         (0.005)
XWARt-1             -0.002           0.003
                    (0.004)         (0.007)
Agentet              0.399           0.277
                    (0.283)         (0.180)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.8494, df = 5, p-value = 0.4345
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Pooling)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.010           -0.011
                    (0.009)         (0.009)
Años contratot      -0.007           -0.043
                    (0.021)         (0.037)
Eqipot              0.004*           0.006
                    (0.002)         (0.007)
XWHIP2t             -0.013           0.011
                    (0.009)         (0.011)
XWHIP2t-1            0.001           -0.006
                    (0.008)         (0.016)
Agentet              0.295           0.268
                    (0.281)         (0.181)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.4521, df = 5, p-value = 0.3632
alternative hypothesis: one model is inconsistent
```

Efectos fijos

Bateadores

```
# To store results:
hitter_model_fe_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_hitter_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_h <- paste(vars_fe, stat_hitter_t[[i]],
                      sep = '+')
  formula <- paste(base_vars_h,
                   stat_hitter_t_1[[i]],
                   sep = " + ")

  hitter_model_fe_fa[[i]] <- plm(formula, data = hitter_first_two,
                                 model = "within",
                                 index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(hitter_model_fe_fa[[i]],
                              vcov = vcovHC(hitter_model_fe_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  h_m_fix_ef_f <- plm(formula, data = hitter_remaining,
                      model = "within",
                      index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(h_m_fix_ef_f,
                              vcov = vcovHC(h_m_fix_ef_f,
                                            type = "HC1",
                                            cluster = "group"))

  # To store models
  h_m_fix_ef <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(h_m_fix_ef,
            no.space = TRUE,
            type = "text",
            title = "Bateadores regulares: Efecto de la edad (Within)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = hitter_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(hitter_model_fe_fa[[i]],h_m_fix_ef_f))
}
```

```
Bateadores regulares: Efecto de la edad (Within)
================================================
```

```
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               0.011         -0.006***
                   (0.013)         (0.002)
Años contratot     -0.019         -0.054***
                   (0.012)         (0.006)
Eqipot              0.001           0.004
                   (0.001)         (0.003)
XABt                0.001           0.003
                   (0.001)         (0.003)
XABt-1              0.001           0.002
                   (0.001)         (0.002)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.5754, df = 5, p-value = 0.9042
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               0.007         -0.007***
                   (0.012)         (0.002)
Años contratot     -0.018         -0.052***
                   (0.012)         (0.006)
Eqipot              0.001           0.004
                   (0.001)         (0.003)
XAB2t              -0.0001          0.001
                  (0.0001)        (0.0005)
XAB2t-1            0.00002        -0.00004
                  (0.0001)         (0.001)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 2.5791, df = 5, p-value = 0.7645
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.008         -0.007***
                    (0.013)         (0.002)
Años contratot      -0.019         -0.055***
                    (0.012)         (0.006)
Eqipot               0.001          0.005*
                    (0.001)         (0.002)
XHt                 -0.0002         0.005
                    (0.001)         (0.005)
XHt-1                0.001          0.002
                    (0.002)         (0.005)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.3761, df = 5, p-value = 0.795
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007         -0.007***
                    (0.011)         (0.001)
Años contratot      -0.021         -0.049***
                    (0.013)         (0.004)
Eqipot              0.002*          0.005**
                    (0.001)         (0.002)
XH2t                0.050*          -0.040
                    (0.027)         (0.066)
XH2t-1              0.071**         0.059**
```

```
                    (0.035)         (0.029)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 7.3955, df = 5, p-value = 0.1928
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007         -0.007***
                    (0.011)         (0.002)
Años contratot      -0.018         -0.049***
                    (0.012)         (0.010)
Eqipot               0.001          0.005**
                    (0.001)         (0.002)
XBAt                -0.020           -0.028
                    (0.070)         (0.111)
XBAt-1               0.041          0.064**
                    (0.032)         (0.031)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.77608, df = 5, p-value = 0.9785
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007         -0.007***
```

```
                    (0.014)         (0.002)
Años contratot      -0.020          -0.058***
                    (0.012)         (0.007)
Eqipot               0.001           0.004**
                    (0.001)         (0.002)
XBA2t                0.003           0.024**
                    (0.006)         (0.009)
XBA2t-1              0.002           0.016
                    (0.005)         (0.014)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.0269, df = 5, p-value = 0.4126
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt                0.009          -0.007***
                    (0.012)         (0.002)
Años contratot      -0.018          -0.052***
                    (0.014)         (0.008)
Eqipot               0.001           0.005**
                    (0.001)         (0.002)
XDt                 -0.0005          0.006*
                    (0.001)         (0.003)
XDt-1                0.001           0.007
                    (0.001)         (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.0863, df = 5, p-value = 0.6867
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
```

```
===============================================
                   Dependent variable:
             -------------------------------

             Primeros dos años Años restantes
                    (1)             (2)
-----------------------------------------------
Edadt              0.011         -0.006***
                  (0.013)         (0.002)
Años contratot    -0.019         -0.058***
                  (0.012)         (0.008)
Eqipot             0.001          0.005*
                  (0.001)         (0.003)
XD2t               0.002          0.006
                  (0.002)         (0.007)
XD2t-1             0.002          0.004
                  (0.002)         (0.004)
===============================================
===============================================
Note:             *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.2255, df = 5, p-value = 0.9988
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                   Dependent variable:
             -------------------------------

             Primeros dos años Años restantes
                    (1)             (2)
-----------------------------------------------
Edadt              0.007         -0.007***
                  (0.011)         (0.002)
Años contratot    -0.023*        -0.050***
                  (0.013)         (0.004)
Eqipot             0.002          0.005***
                  (0.001)         (0.002)
XHRt               0.018          0.007
                  (0.013)         (0.044)
XHRt-1            0.057*         -0.030**
                  (0.031)         (0.012)
===============================================
===============================================
Note:             *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 42.17, df = 5, p-value = 5.443e-08
alternative hypothesis: one model is inconsistent
```

Bateadores regulares: Efecto de la edad (Within)

	Dependent variable:	
	Primeros dos años (1)	Años restantes (2)
Edadt	0.008	-0.007***
	(0.011)	(0.001)
Años contratot	-0.023*	-0.050***
	(0.013)	(0.006)
Eqipot	0.002	0.005***
	(0.001)	(0.002)
XHR2t	0.061	-0.022
	(0.050)	(0.080)
XHR2t-1	0.099**	0.012
	(0.044)	(0.043)
Note:	*p<0.1; **p<0.05; ***p<0.01	

```
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 24.867, df = 5, p-value = 0.0001478
alternative hypothesis: one model is inconsistent
```

Bateadores regulares: Efecto de la edad (Within)

	Dependent variable:	
	Primeros dos años (1)	Años restantes (2)
Edadt	0.009	-0.006***
	(0.011)	(0.002)
Años contratot	-0.022	-0.049***
	(0.014)	(0.006)
Eqipot	0.002*	0.005**
	(0.001)	(0.002)
XGSt	0.158**	-0.058
	(0.075)	(0.091)

```
XGSt-1              0.024          0.079*
                   (0.033)        (0.046)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 16.947, df = 5, p-value = 0.004601
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               0.008         -0.007***
                   (0.012)         (0.002)
Años contratot     -0.018         -0.064***
                   (0.012)         (0.010)
Eqipot              0.001           0.005
                   (0.001)         (0.003)
XGS2t              -0.001           0.006
                   (0.002)         (0.008)
XGS2t-1             0.003           0.006
                   (0.002)         (0.006)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.2705, df = 5, p-value = 0.8106
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
```

```
Edadt                 0.006          -0.010***
                     (0.012)          (0.003)
Años contratot       -0.018          -0.066***
                     (0.012)          (0.012)
Eqipot                0.001            0.003*
                     (0.001)          (0.002)
XOPSt                 0.001           -0.030
                     (0.019)          (0.035)
XOPSt-1               0.005           0.049**
                     (0.019)          (0.024)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 9.6581, df = 5, p-value = 0.08552
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                 0.006          -0.010***
                     (0.012)          (0.002)
Años contratot       -0.017            0.001
                     (0.012)          (0.014)
Eqipot                0.001           0.005***
                     (0.001)          (0.001)
XOPS2t                0.002           0.097***
                     (0.006)          (0.020)
XOPS2t-1              0.004           0.030***
                     (0.007)          (0.004)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 43.387, df = 5, p-value = 3.085e-08
alternative hypothesis: one model is inconsistent
```

```
Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.003         -0.008***
                    (0.011)         (0.001)
Años contratot      -0.024*        -0.060***
                    (0.013)         (0.007)
Eqipot               0.001          0.006***
                    (0.001)         (0.002)
XOBPt               0.020*          0.048***
                    (0.010)         (0.014)
XOBPt-1              0.009           -0.004
                    (0.013)         (0.016)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.1343, df = 5, p-value = 0.5302
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.005          -0.007**
                    (0.010)         (0.003)
Años contratot      -0.020         -0.063***
                    (0.015)         (0.008)
Eqipot               0.001          0.005**
                    (0.001)         (0.002)
XOBP2t               0.004          0.051***
                    (0.007)         (0.018)
XOBP2t-1             0.008          -0.038*
                    (0.009)         (0.021)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 11.99, df = 5, p-value = 0.03493
alternative hypothesis: one model is inconsistent
```

Starting pitcher

```r
# To store results:
fielder_model_fe_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_fielder_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_s <- paste(vars_fe, stat_fielder_t[[i]],
                       sep = '+')
  formula <- paste(base_vars_s,
                   stat_fielder_t_1[[i]],
                   sep = " + ")

  fielder_model_fe_fa[[i]] <- plm(formula, data = starting_first_two,
                                  model = "within",
                                  index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(fielder_model_fe_fa[[i]],
                              vcov = vcovHC(fielder_model_fe_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  s_m_fix_ef_f <- plm(formula, data = starting_remaining,
                      model = "within",
                      index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(s_m_fix_ef_f,
                              vcov = vcovHC(s_m_fix_ef_f,
                                            type = "HC1",
                                            cluster = "group"))

  # To store models
  s_m_fix_ef <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(s_m_fix_ef,
            no.space = TRUE,
            type = "text",
            title = "Lanzadores iniciales: Efecto de la edad (Within)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = fielder_stats_long[[i]])

  # Hausman test:
  print("")
```

```
  print("Test para cambio estructural entre periodos:")
  print(phtest(fielder_model_fe_fa[[i]],s_m_fix_ef_f))
}
```

```
Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.004          0.108**
                    (0.022)         (0.042)
Años contratot       0.001          0.140**
                    (0.008)         (0.056)
Eqipot              0.002*           0.003
                    (0.001)         (0.004)
XH2t               -0.00004          0.0002
                   (0.0001)        (0.0002)
XH2t-1              0.00000         -0.0001
                   (0.0001)        (0.0002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.5334, df = 5, p-value = 0.9092
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.005          0.090**
                    (0.017)         (0.040)
Años contratot      -0.020*          0.116*
                    (0.011)         (0.058)
Eqipot              0.003**          0.006*
                    (0.001)         (0.003)
XHt                 0.006*           0.002
                    (0.003)         (0.001)
XHt-1               -0.0001         0.005***
                    (0.002)         (0.001)
```

```
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.0464, df = 5, p-value = 0.6928
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.002          0.107**
                    (0.020)         (0.046)
Años contratot      -0.001          0.143**
                    (0.008)         (0.062)
Eqipot              0.002*           0.002
                    (0.001)         (0.005)
XR2t                -0.0002          0.0005
                   (0.0002)        (0.0003)
XR2t-1              0.0002          -0.0003
                   (0.0002)        (0.0004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 61.753, df = 5, p-value = 5.275e-12
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.002           0.102*
                    (0.021)         (0.050)
```

```
Años contratot      -0.002          0.136*
                    (0.008)        (0.069)
Eqipot               0.002          0.005
                    (0.001)        (0.004)
XER2t                0.001          0.002
                    (0.002)        (0.003)
XER2t-1              0.003          0.005
                    (0.002)        (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.936, df = 5, p-value = 0.5587
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.002         0.127***
                    (0.017)        (0.036)
Años contratot       0.008         0.160***
                    (0.010)        (0.050)
Eqipot               0.001          0.004*
                    (0.001)        (0.002)
XERt                0.020*         -0.025*
                    (0.011)        (0.013)
XERt-1              -0.012          0.004
                    (0.009)        (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 23.981, df = 5, p-value = 0.000219
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
```

```
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.003          0.095*
                    (0.020)        (0.051)
Años contratot      -0.008          0.124*
                    (0.010)        (0.068)
Eqipot               0.002          0.003
                    (0.001)        (0.004)
XRt                  0.003          0.002
                    (0.002)        (0.002)
XRt-1                0.003          0.002
                    (0.002)        (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.0658, df = 5, p-value = 0.4079
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.005          0.103*
                    (0.022)        (0.057)
Años contratot      -0.0001         0.112
                    (0.008)        (0.091)
Eqipot              0.002*          0.003
                    (0.001)        (0.004)
XComando2t          -0.003         -0.016
                    (0.007)        (0.023)
XComando2t-1        0.00000         0.011
                   (0.00000)       (0.011)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 5.1623, df = 5, p-value = 0.3964
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.001         0.115**
                     (0.022)        (0.042)
Años contratot       -0.007         0.144**
                     (0.006)        (0.054)
Eqipot                0.002          0.004
                     (0.001)        (0.006)
XComandot             0.017         -0.036**
                     (0.028)        (0.015)
XComandot-1          0.0003          0.001
                    (0.0003)        (0.046)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.733, df = 5, p-value = 0.2413
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.003         0.102***
                     (0.020)        (0.027)
Años contratot        0.001         0.134***
                     (0.010)        (0.039)
Eqipot               0.002**         0.005*
                     (0.001)        (0.003)
XControl2t           -0.073         0.267***
                     (0.061)        (0.057)
XControl2t-1         -0.044*       -0.457***
```

```
                    (0.023)         (0.041)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 569.39, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.001          0.058**
                    (0.018)         (0.023)
Años contratot      -0.003          0.091**
                    (0.010)         (0.031)
Eqipot              0.002*          0.010***
                    (0.001)         (0.003)
XControlt           -0.018           -0.014
                    (0.041)         (0.047)
XControlt-1         -0.065         -0.260***
                    (0.049)         (0.044)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.67473, df = 5, p-value = 0.9843
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.003           0.016
```

```
                    (0.018)         (0.017)
Años contratot       0.004           0.009
                    (0.010)         (0.022)
Eqipot              0.003*           -0.001
                    (0.001)         (0.001)
XDominio2t          -0.020           0.013*
                    (0.037)         (0.007)
XDominio2t-1        0.028*          -0.135***
                    (0.015)         (0.011)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 146.83, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.005          -0.015**
                    (0.019)         (0.005)
Años contratot      -0.001          -0.020**
                    (0.010)         (0.007)
Eqipot              0.002*           0.002*
                    (0.001)         (0.001)
XDominiot            0.002          -0.064***
                    (0.016)         (0.020)
XDominiot-1          0.017          -0.122***
                    (0.020)         (0.013)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.189, df = 5, p-value = 0.004155
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
```

```
================================================
                  Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
------------------------------------------------
Edadt                -0.003          0.107*
                     (0.021)        (0.051)
Años contratot        0.001          0.123
                     (0.008)        (0.070)
Eqipot               0.002*          0.005
                     (0.001)        (0.004)
XERA2t               -0.0001         0.0002
                    (0.0001)        (0.0001)
XERA2t-1             0.0001          0.0002
                    (0.0001)        (0.0001)
================================================
================================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.8544, df = 5, p-value = 0.7224
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
================================================
                  Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
------------------------------------------------
Edadt                -0.0002         0.123*
                     (0.019)        (0.057)
Años contratot        0.002          0.150*
                     (0.011)        (0.076)
Eqipot               0.002*          0.005
                     (0.001)        (0.004)
XERAt                -0.001          0.002*
                     (0.001)        (0.001)
XERAt-1              0.002*          0.003
                     (0.001)        (0.002)
================================================
================================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 66.645, df = 5, p-value = 5.106e-13
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.003          0.111*
                    (0.020)        (0.052)
Años contratot      -0.001          0.143*
                    (0.009)        (0.075)
Eqipot              0.002*          0.003
                    (0.001)        (0.004)
XIP2t                0.001          0.001
                    (0.001)        (0.004)
XIP2t-1             0.0004          -0.002
                    (0.001)        (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.931, df = 5, p-value = 0.03574
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.004         0.105**
                    (0.020)        (0.047)
Años contratot      -0.001          0.132*
                    (0.009)        (0.065)
Eqipot              0.002*          0.002
                    (0.001)        (0.003)
XIPt               0.301***        0.067***
                    (0.005)        (0.003)
```

```
XIPt-1                0.014          0.236***
                     (0.018)        (0.056)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 15.505, df = 5, p-value = 0.00841
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                      Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.004          0.104**
                     (0.020)        (0.047)
Años contratot       -0.001           0.131*
                     (0.009)        (0.066)
Eqipot               0.002*           0.002
                     (0.001)        (0.003)
XL2t                0.191***         0.042***
                     (0.021)        (0.005)
XL2t-1                0.017           0.066
                     (0.039)        (0.045)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.197, df = 5, p-value = 0.00414
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                      Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
```

```
Edadt               -0.001          0.108*
                    (0.019)        (0.053)
Años contratot       0.006          0.127
                    (0.012)        (0.074)
Eqipot              0.002*          0.004
                    (0.001)        (0.003)
XDLt                -0.0001        0.0002*
                   (0.0001)        (0.0001)
XLt-1              -0.00004         0.0002
                   (0.0001)        (0.0001)
================================================
================================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.555, df = 5, p-value = 0.00356
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
================================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
------------------------------------------------
Edadt               -0.003          0.121*
                    (0.019)        (0.056)
Años contratot      -0.009          0.138*
                    (0.012)        (0.073)
Eqipot              0.002*          0.005
                    (0.001)        (0.004)
XS2t                 0.002         0.002**
                    (0.001)        (0.001)
XS2t-1               0.002         0.003**
                    (0.001)        (0.001)
================================================
================================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.6217, df = 5, p-value = 0.3448
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.003          0.101*
                     (0.019)        (0.051)
Años contratot        0.001          0.148
                     (0.010)        (0.085)
Eqipot               0.002*          0.001
                     (0.001)        (0.002)
XSt                  -0.003         0.046***
                     (0.003)        (0.010)
XSt-1                -0.001         -0.009**
                     (0.002)        (0.004)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 13.086, df = 5, p-value = 0.02259
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                 0.007         0.120***
                     (0.018)        (0.035)
Años contratot        0.008         0.153***
                     (0.010)        (0.048)
Eqipot               0.002*          0.004
                     (0.001)        (0.003)
XSO2t                 0.013          -0.005
                     (0.015)        (0.048)
XSO2t-1             -0.030*          -0.014
                     (0.016)        (0.022)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 9.2912, df = 5, p-value = 0.098
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.003         0.111**
                    (0.018)        (0.037)
Años contratot       0.003         0.140**
                    (0.008)        (0.052)
Eqipot               0.002          0.003
                    (0.001)        (0.003)
XSOt                 0.005          -0.005
                    (0.021)        (0.040)
XSOt-1              -0.047*         -0.005
                    (0.025)        (0.016)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 14.55, df = 5, p-value = 0.01247
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               0.0003          0.099*
                    (0.018)        (0.051)
Años contratot      -0.001          0.126*
                    (0.009)        (0.070)
Eqipot              0.002*          0.002
                    (0.001)        (0.006)
XWAR2t               0.001          0.0005
```

```
                  (0.0004)        (0.001)
XWAR2t-1           0.001          -0.0002
                  (0.0003)        (0.001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.659, df = 5, p-value = 0.003405
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.003          0.094*
                    (0.019)        (0.049)
Años contratot       0.001          0.104
                    (0.012)        (0.066)
Eqipot               0.001          0.007
                    (0.001)        (0.004)
XWARt                0.005          0.002
                    (0.003)        (0.004)
XWARt-1             0.006*         0.009***
                    (0.003)        (0.002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 22.669, df = 5, p-value = 0.0003904
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Within)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
```

```
-----------------------------------------------
Edadt                -0.003          0.123*
                     (0.020)         (0.058)
Años contratot        0.003           0.141*
                     (0.012)         (0.075)
Eqipot               0.002*           0.005
                     (0.001)         (0.004)
XWHIP2t              -0.004          0.009***
                     (0.006)         (0.002)
XWHIP2t-1             0.001           0.008
                     (0.005)         (0.007)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 8.3385, df = 5, p-value = 0.1385
alternative hypothesis: one model is inconsistent
```

Efectos aleatorios

Bateadores

```r
# To store results:
hitter_model_random_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_hitter_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_h  <- paste(vars_ms, stat_hitter_t[[i]],
                    sep = '+')
  formula <- paste(base_vars_h,
                   stat_hitter_t_1[[i]],
                   sep = " + ")

  hitter_model_random_fa[[i]] <- plm(formula, data = hitter_first_two,
                                     model = "random",
                                     index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(hitter_model_random_fa[[i]],
                              vcov = vcovHC(hitter_model_random_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))
  print(my_lm_cluster_i)

  print("Remaining years:")
  h_m_random_f <- plm(formula, data = hitter_remaining,
                      model = "random",
```

```r
                     index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(h_m_random_f,
                              vcov = vcovHC(h_m_random_f,
                                            type = "HC1",
                                            cluster = "group"))

  # To store models
  h_m_random <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(h_m_random,
            no.space = TRUE,
            type = "text",
            title = "Bateadores regulares: Efecto de la edad (Random Effects)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = hitter_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(hitter_model_random_fa[[i]],h_m_random_f))
}
```

```
t test of coefficients:

                      Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.23298165  0.15218253  1.5309   0.1270
Edad_t              -0.00813961  0.00514685 -1.5815   0.1150
Anios_de_contrato_t -0.01206878  0.01080499 -1.1170   0.2650
team_num_t           0.00067624  0.00091388  0.7400   0.4600
X_At_bats_t         -0.00042638  0.00080174 -0.5318   0.5953
X_At_bats_t_1       -0.00020215  0.00085886 -0.2354   0.8141

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.008         -0.008***
                    (0.005)         (0.003)
Años contratot      -0.012          -0.015
                    (0.011)         (0.025)
Eqipot               0.001           0.003*
                    (0.001)         (0.002)
XABt                -0.0004          0.003*
                    (0.001)         (0.002)
XABt-1              -0.0002          0.0003
```

```
                  (0.001)         (0.002)
Agentet            0.233          0.251**
                  (0.152)         (0.116)
===============================================
===============================================
Note:             *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.713, df = 5, p-value = 0.03893
alternative hypothesis: one model is inconsistent


t test of coefficients:

                       Estimate  Std. Error t value Pr(>|t|)
(Intercept)          2.0874e-01  1.4596e-01  1.4300   0.1539
Edad_t              -7.4153e-03  4.9172e-03 -1.5080   0.1328
Anios_de_contrato_t -1.1520e-02  1.0859e-02 -1.0609   0.2897
team_num_t           5.9238e-04  9.1027e-04  0.6508   0.5158
X_Bateos_2_t        -1.9080e-04  1.2966e-04 -1.4715   0.1424
X_Bateos_2_t_1       9.0507e-05  8.2322e-05  1.0994   0.2726

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt             -0.007          -0.009***
                  (0.005)         (0.003)
Años contratot    -0.012           -0.015
                  (0.011)         (0.024)
Eqipot             0.001           0.003*
                  (0.001)         (0.002)
XAB2t             -0.0002          0.001**
                 (0.0001)         (0.0004)
XAB2t-1           0.0001          -0.0004
                 (0.0001)         (0.0003)
Agentet            0.209           0.278**
                  (0.146)         (0.107)
===============================================
===============================================
Note:             *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 10.299, df = 5, p-value = 0.06719
alternative hypothesis: one model is inconsistent


t test of coefficients:

                      Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.22586645  0.14642803  1.5425  0.12417
Edad_t              -0.00797190  0.00499472 -1.5961  0.11169
Anios_de_contrato_t -0.01171523  0.01088329 -1.0764  0.28273
team_num_t           0.00076325  0.00087588  0.8714  0.38433
X_Bateos_t          -0.00217031  0.00125416 -1.7305  0.08473 .
X_Bateos_t_1         0.00011938  0.00123219  0.0969  0.92290
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)            (2)
-----------------------------------------------
Edadt               -0.008        -0.008***
                    (0.005)        (0.003)
Años contratot      -0.012         -0.016
                    (0.011)        (0.026)
Eqipot               0.001         0.003**
                    (0.001)        (0.002)
XHt                 -0.002*         0.006
                    (0.001)        (0.004)
XHt-1               0.0001          0.001
                    (0.001)        (0.004)
Agentet              0.226         0.251**
                    (0.146)        (0.112)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 10.047, df = 5, p-value = 0.07392
alternative hypothesis: one model is inconsistent
```

```
t test of coefficients:

                         Estimate  Std. Error t value Pr(>|t|)
(Intercept)            0.19959126  0.15026720  1.3282  0.18526
Edad_t                -0.00743447  0.00506452 -1.4680  0.14333
Anios_de_contrato_t   -0.01282847  0.01055348 -1.2156  0.22525
team_num_t             0.00083052  0.00091388  0.9088  0.36431
X_Bateos_promedio_t   -0.01259034  0.02230496 -0.5645  0.57293
X_Bateos_promedio_t_1  0.04419900  0.02574526  1.7168  0.08721 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.007        -0.008***
                    (0.005)        (0.003)
Años contratot      -0.013          -0.009
                    (0.011)        (0.026)
Eqipot               0.001          0.004*
                    (0.001)        (0.002)
XH2t                -0.013          -0.045
                    (0.022)        (0.056)
XH2t-1              0.044*          0.051
                    (0.026)        (0.040)
Agentet              0.200          0.236**
                    (0.150)        (0.103)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.1669, df = 5, p-value = 0.6743
alternative hypothesis: one model is inconsistent


t test of coefficients:

                           Estimate  Std. Error t value Pr(>|t|)
(Intercept)              0.19395369  0.15121231  1.2827   0.2008
Edad_t                  -0.00698411  0.00509814 -1.3699   0.1719
Anios_de_contrato_t     -0.01216901  0.01040435 -1.1696   0.2432
team_num_t               0.00057337  0.00088821  0.6455   0.5191
```

```
X_Bateos_promedio_2_t   -0.04677970  0.03727052 -1.2551   0.2106
X_Bateos_promedio_2_t_1  0.03977767  0.02564118  1.5513   0.1220

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.007         -0.007***
                     (0.005)        (0.003)
Años contratot       -0.012          -0.007
                     (0.010)        (0.028)
Eqipot                0.001           0.004*
                     (0.001)        (0.002)
XBAt                 -0.047          -0.083
                     (0.037)        (0.088)
XBAt-1                0.040          -0.006
                     (0.026)        (0.034)
Agentet               0.194           0.195*
                     (0.151)        (0.111)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.09251, df = 5, p-value = 0.9999
alternative hypothesis: one model is inconsistent


t test of coefficients:

                       Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.21650421  0.14983908  1.4449   0.1497
Edad_t              -0.00756270  0.00510894 -1.4803   0.1400
Anios_de_contrato_t -0.01335935  0.01079912 -1.2371   0.2172
team_num_t           0.00060141  0.00088033  0.6832   0.4951
X_Home_runs_t        0.00107807  0.00487178  0.2213   0.8250
X_Home_runs_t_1      0.00068088  0.00314656  0.2164   0.8289

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.008         -0.007***
                    (0.005)         (0.003)
Años contratot      -0.013           -0.025
                    (0.011)         (0.025)
Eqipot               0.001           0.003*
                    (0.001)         (0.002)
XBA2t                0.001          0.021**
                    (0.005)         (0.010)
XBA2t-1              0.001          0.016**
                    (0.003)         (0.007)
Agentet              0.217          0.248**
                    (0.150)         (0.113)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 12.381, df = 5, p-value = 0.02993
alternative hypothesis: one model is inconsistent


t test of coefficients:

                       Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.20709968  0.14436921  1.4345   0.1526
Edad_t              -0.00732079  0.00497698 -1.4709   0.1425
Anios_de_contrato_t -0.01279084  0.01192645 -1.0725   0.2845
team_num_t           0.00065570  0.00089956  0.7289   0.4667
X_Home_runs_2_t     -0.00044148  0.00091705 -0.4814   0.6306
X_Home_runs_2_t_1    0.00044396  0.00067863  0.6542   0.5136

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.007          -0.007**
                    (0.005)         (0.003)
Años contratot      -0.013           -0.017
                    (0.012)         (0.028)
Eqipot               0.001          0.004**
```

```
                 (0.001)         (0.002)
XDt              -0.0004          -0.002
                 (0.001)         (0.005)
XDt-1            0.0004           -0.002
                 (0.001)         (0.002)
Agentet           0.207           0.197*
                 (0.144)         (0.118)
===============================================
===============================================
Note:            *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.9793, df = 5, p-value = 0.7032
alternative hypothesis: one model is inconsistent


t test of coefficients:

                          Estimate  Std. Error t value Pr(>|t|)
(Intercept)             0.23446318  0.15269634  1.5355   0.1259
Edad_t                 -0.00819320  0.00517467 -1.5833   0.1146
Anios_de_contrato_t    -0.01213999  0.01080593 -1.1235   0.2623
team_num_t              0.00066360  0.00091514  0.7251   0.4690
X_Juegos_iniciados_t   -0.00103273  0.00148343 -0.6962   0.4869
X_Juegos_iniciados_t_1 -0.00029708  0.00161726 -0.1837   0.8544

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt            -0.008         -0.008***
                 (0.005)         (0.003)
Años contratot   -0.012           -0.016
                 (0.011)         (0.027)
Eqipot            0.001           0.004*
                 (0.001)         (0.002)
XD2t             -0.001           0.005
                 (0.001)         (0.004)
XD2t-1           -0.0003          0.001
                 (0.002)         (0.004)
Agentet           0.234           0.243**
                 (0.153)         (0.119)
===============================================
===============================================
```

```
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 7.749, df = 5, p-value = 0.1706
alternative hypothesis: one model is inconsistent


t test of coefficients:

                                          Estimate  Std. Error t value Pr(>|t|)
(Intercept)                             0.20674545  0.15160192  1.3637   0.1738
Edad_t                                 -0.00749602  0.00504404 -1.4861   0.1385
Anios_de_contrato_t                    -0.01388757  0.01082147 -1.2833   0.2005
team_num_t                              0.00074447  0.00089566  0.8312   0.4066
X_Porcentaje_On_base_plus_slugging_t   -0.01537803  0.01295373 -1.1872   0.2363
X_Porcentaje_On_base_plus_slugging_t_1  0.02366300  0.02173902  1.0885   0.2774

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.007        -0.008***
                    (0.005)        (0.003)
Años contratot      -0.014          -0.010
                    (0.011)        (0.026)
Eqipot               0.001         0.004**
                    (0.001)        (0.002)
XHRt                -0.015          -0.001
                    (0.013)        (0.041)
XHRt-1               0.024          -0.028
                    (0.022)        (0.023)
Agentet              0.207         0.227**
                    (0.152)        (0.108)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.6296, df = 5, p-value = 0.2497
alternative hypothesis: one model is inconsistent
```

```
t test of coefficients:

                            Estimate  Std. Error t value Pr(>|t|)
(Intercept)               0.20236622  0.15054290  1.3442   0.1800
Edad_t                   -0.00743461  0.00503614 -1.4763   0.1411
Anios_de_contrato_t      -0.01447512  0.01078147 -1.3426   0.1806
team_num_t                0.00076208  0.00087652  0.8694   0.3854
X_Porcentaje_on_base_t   -0.01205993  0.03264452 -0.3694   0.7121
X_Porcentaje_on_base_t_1  0.04307916  0.03031819  1.4209   0.1565

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.007         -0.008***
                     (0.005)         (0.003)
Años contratot       -0.014          -0.007
                     (0.011)         (0.027)
Eqipot                0.001          0.003*
                     (0.001)         (0.002)
XHR2t                -0.012          -0.058
                     (0.033)         (0.060)
XHR2t-1               0.043          0.036
                     (0.030)         (0.040)
Agentet               0.202          0.236**
                     (0.151)         (0.108)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.8881, df = 5, p-value = 0.3173
alternative hypothesis: one model is inconsistent


t test of coefficients:

                              Estimate  Std. Error t value Pr(>|t|)
(Intercept)                 0.20697302  0.14829998  1.3956   0.1640
Edad_t                     -0.00739562  0.00502007 -1.4732   0.1419
Anios_de_contrato_t        -0.01316244  0.01074052 -1.2255   0.2215
team_num_t                  0.00066985  0.00091060  0.7356   0.4626
```

```
X_Porcentaje_on_base_2_t   -0.00713576  0.03926458 -0.1817   0.8559
X_Porcentaje_on_base_2_t_1  0.03476448  0.02761710  1.2588   0.2092

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.007         -0.007***
                     (0.005)        (0.003)
Años contratot       -0.013          -0.009
                     (0.011)        (0.027)
Eqipot                0.001          0.004**
                     (0.001)        (0.002)
XGSt                 -0.007          -0.076
                     (0.039)        (0.075)
XGSt-1                0.035          0.00001
                     (0.028)        (0.042)
Agentet               0.207           0.198*
                     (0.148)        (0.112)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.8848, df = 5, p-value = 0.7177
alternative hypothesis: one model is inconsistent


t test of coefficients:

                        Estimate  Std. Error t value Pr(>|t|)
(Intercept)           0.21483978  0.14710882  1.4604   0.1454
Edad_t               -0.00765543  0.00502615 -1.5231   0.1289
Anios_de_contrato_t  -0.01091281  0.01089617 -1.0015   0.3175
team_num_t            0.00079001  0.00091411  0.8642   0.3883
X_Runs_batted_in_t   -0.00307049  0.00180209 -1.7038   0.0896 .
X_Runs_batted_in_t_1  0.00142636  0.00171407  0.8321   0.4061
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
```

```
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               -0.008        -0.008***
                    (0.005)        (0.003)
Años contratot      -0.011          -0.024
                    (0.011)        (0.028)
Eqipot               0.001          0.003
                    (0.001)        (0.002)
XGS2t               -0.003*         0.008
                    (0.002)        (0.005)
XGS2t-1              0.001          0.004
                    (0.002)        (0.005)
Agentet              0.215         0.267**
                    (0.147)        (0.112)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 10.464, df = 5, p-value = 0.0631
alternative hypothesis: one model is inconsistent


t test of coefficients:

                       Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.21000686  0.14657253  1.4328   0.1531
Edad_t              -0.00734867  0.00495372 -1.4835   0.1392
Anios_de_contrato_t -0.01242060  0.01043153 -1.1907   0.2349
team_num_t           0.00043664  0.00092884  0.4701   0.6387
X_Triples_t         -0.00750583  0.01087465 -0.6902   0.4907
X_Triples_t_1        0.01553773  0.00895467  1.7352   0.0839 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               -0.007        -0.008***
```

```
                    (0.005)         (0.003)
Años contratot      -0.012           -0.015
                    (0.010)         (0.027)
Eqipot              0.0004           0.004*
                    (0.001)         (0.002)
XOPSt               -0.008           -0.005
                    (0.011)         (0.040)
XOPSt-1             0.016*           0.011
                    (0.009)         (0.035)
Agentet              0.210          0.251**
                    (0.147)         (0.123)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.126, df = 5, p-value = 0.8315
alternative hypothesis: one model is inconsistent


t test of coefficients:

                      Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.21065261  0.14921438  1.4117   0.1592
Edad_t              -0.00743279  0.00503890 -1.4751   0.1414
Anios_de_contrato_t -0.01255542  0.01060511 -1.1839   0.2375
team_num_t           0.00062495  0.00088858  0.7033   0.4825
X_Triples_2_t       -0.00033286  0.00424605 -0.0784   0.9376
X_Triples_2_t_1      0.00111222  0.00133640  0.8323   0.4060

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.007         -0.008***
                    (0.005)         (0.002)
Años contratot      -0.013           -0.005
                    (0.011)         (0.020)
Eqipot               0.001          0.004***
                    (0.001)         (0.001)
XOPS2t              -0.0003          0.039
                    (0.004)         (0.031)
XOPS2t-1             0.001           0.020*
                    (0.001)         (0.010)
```

```
Agentet              0.211          0.247***
                    (0.149)        (0.083)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 13.049, df = 5, p-value = 0.02292
alternative hypothesis: one model is inconsistent


t test of coefficients:

                       Estimate  Std. Error t value Pr(>|t|)
(Intercept)          0.27988134  0.13937756  2.0081 0.045669 *
Edad_t              -0.00908894  0.00470776 -1.9306 0.054616 .
Anios_de_contrato_t -0.01696385  0.01068681 -1.5874 0.113646
team_num_t           0.00079385  0.00086411  0.9187 0.359107
X_WAR_t              0.02089586  0.00787592  2.6531 0.008466 **
X_WAR_t_1            0.01875031  0.00922125  2.0334 0.043030 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.009*        -0.012***
                    (0.005)        (0.002)
Años contratot      -0.017          -0.031
                    (0.011)        (0.024)
Eqipot               0.001          0.004**
                    (0.001)        (0.002)
XOBPt              0.021***        0.060***
                    (0.008)        (0.016)
XOBPt-1             0.019**         0.015
                    (0.009)        (0.020)
Agentet             0.280**        0.394***
                    (0.139)        (0.100)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
	Hausman Test

data:  formula
chisq = 7.1932, df = 5, p-value = 0.2067
alternative hypothesis: one model is inconsistent


t test of coefficients:

                      Estimate  Std. Error t value Pr(>|t|)  
(Intercept)         0.25661151  0.13458928  1.9066  0.05767 .
Edad_t             -0.00856865  0.00455832 -1.8798  0.06126 .
Anios_de_contrato_t -0.01262751  0.01118863 -1.1286  0.26011  
team_num_t          0.00053418  0.00090818  0.5882  0.55692  
X_WAR_2_t           0.00561430  0.00510592  1.0996  0.27254  
X_WAR_2_t_1         0.00832851  0.00579709  1.4367  0.15201  
---
Signif. codes:  0 ’***’ 0.001 ’**’ 0.01 ’*’ 0.05 ’.’ 0.1 ’ ’ 1

[1] "Remaining years:"

Bateadores regulares: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:       
               --------------------------------
                                               
               Primeros dos años Años restantes
                      (1)             (2)      
-----------------------------------------------
Edadt               -0.009*        -0.006**    
                    (0.005)        (0.002)     
Años contratot      -0.013          -0.031     
                    (0.011)        (0.022)     
Eqipot               0.001         0.004**     
                    (0.001)        (0.002)     
XOBP2t               0.006         0.060***    
                    (0.005)        (0.021)     
XOBP2t-1             0.008          0.008*     
                    (0.006)        (0.004)     
Agentet             0.257*         0.219**     
                    (0.135)        (0.096)     
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

	Hausman Test

data:  formula
chisq = 11.987, df = 5, p-value = 0.03497
alternative hypothesis: one model is inconsistent
```

Starting pitcher

```r
# To store results:
fielder_model_random_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_fielder_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_s  <- paste(vars_ms, stat_fielder_t[[i]],
                       sep = '+')
  formula <- paste(base_vars_s,
                   stat_fielder_t_1[[i]],
                   sep = " + ")

  fielder_model_random_fa[[i]] <- plm(formula, data = starting_first_two,
                                      model = "random",
                                      index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(fielder_model_random_fa[[i]],
                              vcov = vcovHC(fielder_model_random_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  s_m_random_f <- plm(formula, data = starting_remaining,
                      model = "random",
                      index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(s_m_random_f,
                              vcov = vcovHC(s_m_random_f,
                                            type = "HC1",
                                            cluster = "group"))

  # To store models
  s_m_random_ef <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(s_m_random_ef,
            no.space = TRUE,
            type = "text",
            title = "Lanzadores iniciales: Efecto de la edad (Random Effects)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = fielder_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(fielder_model_random_fa[[i]],s_m_random_f))
}
```

```
Lanzadores iniciales: Efecto de la edad (Random Effects)
==============================================
                     Dependent variable:
               -------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.009          -0.005
                     (0.009)         (0.011)
Años contratot       -0.002          -0.023
                     (0.012)         (0.014)
Eqipot               0.002*           0.001
                     (0.001)         (0.004)
XH2t                 -0.0002          0.0002
                    (0.0001)        (0.0001)
XH2t-1               -0.0001         -0.0002
                    (0.0001)        (0.0002)
Agentet               0.291           0.127
                     (0.291)         (0.340)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 10.023, df = 5, p-value = 0.07458
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.011          -0.005
                     (0.008)         (0.012)
Años contratot       -0.017          -0.018
                     (0.012)         (0.013)
Eqipot               0.003**          0.003
                     (0.001)         (0.003)
XHt                   0.003          0.002**
                     (0.003)         (0.001)
XHt-1                -0.0005          0.003
                     (0.001)         (0.003)
Agentet               0.354           0.064
                     (0.275)         (0.398)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 8.1801, df = 5, p-value = 0.1466
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                     (1)            (2)
-----------------------------------------------
Edadt               -0.010          -0.005
                    (0.009)        (0.011)
Años contratot      -0.010          -0.014
                    (0.010)        (0.014)
Eqipot              0.003**         0.001
                    (0.001)        (0.004)
XR2t                -0.0001        0.001**
                   (0.0003)        (0.0003)
XR2t-1             -0.00005        -0.0003
                   (0.0001)        (0.0004)
Agentet              0.308          0.098
                    (0.296)        (0.312)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.7425, df = 5, p-value = 0.2405
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                     (1)            (2)
-----------------------------------------------
Edadt               -0.009          -0.004
                    (0.009)        (0.012)
Años contratot      -0.007          -0.013
                    (0.011)        (0.013)
Eqipot              0.002*          0.002
```

```
                   (0.001)         (0.003)
XER2t              -0.003          0.004***
                   (0.002)         (0.001)
XER2t-1             0.001           0.003
                   (0.002)         (0.003)
Agentet             0.295           0.059
                   (0.288)         (0.373)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 22.724, df = 5, p-value = 0.0003812
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)            (2)
-----------------------------------------------
Edadt              -0.008          -0.004
                   (0.008)         (0.012)
Años contratot     -0.010          -0.021*
                   (0.012)         (0.012)
Eqipot             0.002*           0.0001
                   (0.001)         (0.003)
XERt               0.0004          -0.004
                   (0.011)         (0.010)
XERt-1            -0.023**          0.004
                   (0.010)         (0.007)
Agentet             0.256           0.101
                   (0.274)         (0.372)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 8.6474, df = 5, p-value = 0.124
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
```

```
=================================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                     (1)             (2)
-------------------------------------------------
Edadt               -0.010          -0.005
                    (0.009)        (0.012)
Años contratot      -0.010          -0.013
                    (0.012)        (0.014)
Eqipot              0.003*          0.002
                    (0.001)        (0.002)
XRt                 -0.001         0.003**
                    (0.002)        (0.001)
XRt-1                0.001          0.003
                    (0.002)        (0.003)
Agentet              0.310          0.091
                    (0.289)        (0.374)
=================================================
=================================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 22.589, df = 5, p-value = 0.0004045
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
=================================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                     (1)             (2)
-------------------------------------------------
Edadt               -0.010          -0.005
                    (0.009)        (0.009)
Años contratot      -0.011          -0.056
                    (0.010)        (0.037)
Eqipot              0.003**         0.002
                    (0.001)        (0.003)
XComando2t           0.001         -0.044*
                    (0.005)        (0.024)
XComando2t-1       -0.00000         0.024
                   (0.00000)       (0.019)
Agentet              0.310          0.139
                    (0.298)        (0.301)
=================================================
=================================================
```

```
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 7.0527, df = 5, p-value = 0.2168
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.009          -0.001
                    (0.010)         (0.010)
Años contratot      -0.013          -0.015
                    (0.010)         (0.014)
Eqipot              0.002*          -0.001
                    (0.001)         (0.004)
XComandot            0.010          -0.018
                    (0.016)         (0.030)
XComandot-1         -0.0001         -0.020
                   (0.0003)         (0.039)
Agentet              0.306          -0.009
                    (0.296)         (0.330)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.4307, df = 5, p-value = 0.7869
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.011          -0.007
                    (0.009)         (0.009)
```

```
Años contratot      -0.008          -0.024*
                    (0.011)         (0.013)
Eqipot              0.003**         -0.0005
                    (0.001)         (0.003)
XControl2t         -0.114**         0.385***
                    (0.054)         (0.089)
XControl2t-1       -0.086***       -0.374***
                    (0.019)         (0.084)
Agentet              0.300           0.202
                    (0.282)         (0.280)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 34.08, df = 5, p-value = 2.295e-06
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.009           -0.005
                    (0.008)         (0.009)
Años contratot      -0.014           -0.005
                    (0.012)         (0.018)
Eqipot              0.002*          0.007**
                    (0.001)         (0.003)
XControlt            0.028           0.100
                    (0.040)         (0.066)
XControlt-1        -0.077*         -0.232***
                    (0.039)         (0.081)
Agentet              0.274           0.014
                    (0.270)         (0.299)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.9098, df = 5, p-value = 0.5625
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                    Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.009          -0.011
                     (0.008)         (0.010)
Años contratot       -0.011          -0.027
                     (0.012)         (0.020)
Eqipot               0.003**          0.001
                     (0.001)         (0.003)
XDominio2t            0.006          -0.022
                     (0.034)         (0.039)
XDominio2t-1        0.056***         -0.075
                     (0.019)         (0.053)
Agentet               0.285           0.314
                     (0.269)         (0.356)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 624.66, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                    Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.008          -0.020
                     (0.008)         (0.014)
Años contratot       -0.013          -0.028
                     (0.011)         (0.018)
Eqipot               0.002*           0.004
                     (0.001)         (0.004)
XDominiot             0.011          -0.089
                     (0.022)         (0.098)
XDominiot-1         0.062***         -0.059
                     (0.022)         (0.080)
Agentet               0.289           0.550
```

```
                    (0.270)         (0.456)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 43.099, df = 5, p-value = 3.528e-08
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.009          -0.005
                    (0.009)         (0.012)
Años contratot      -0.003          -0.026
                    (0.011)         (0.024)
Eqipot              0.003**          0.002
                    (0.001)         (0.004)
XERA2t              -0.0002         0.0003**
                   (0.0001)         (0.0001)
XERA2t-1            0.00003          0.0001
                   (0.0001)         (0.0002)
Agentet              0.264           0.088
                    (0.297)         (0.361)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.181, df = 5, p-value = 0.004169
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
```

```
-----------------------------------------------
Edadt              -0.009          -0.004
                   (0.009)        (0.011)
Años contratot     -0.008          -0.024
                   (0.012)        (0.015)
Eqipot             0.003**         0.0002
                   (0.001)        (0.004)
XERAt              -0.001          0.002
                   (0.001)        (0.002)
XERAt-1             0.001         -0.0003
                   (0.001)        (0.003)
Agentet             0.280          0.099
                   (0.299)        (0.345)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.6392, df = 5, p-value = 0.4615
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.010          -0.005
                   (0.009)        (0.011)
Años contratot     -0.010          -0.021
                   (0.009)        (0.013)
Eqipot             0.003*          0.002
                   (0.001)        (0.003)
XIP2t              -0.002          0.006*
                   (0.002)        (0.003)
XIP2t-1            0.0003          -0.002
                   (0.001)        (0.004)
Agentet             0.309          0.114
                   (0.289)        (0.360)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 4.9287, df = 5, p-value = 0.4246
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
==============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)             (2)
----------------------------------------------
Edadt              -0.011          -0.006
                   (0.009)        (0.012)
Años contratot     -0.010          -0.024
                   (0.010)        (0.014)
Eqipot             0.003**        -0.0002
                   (0.001)        (0.003)
XIPt              0.261***        0.056***
                   (0.062)        (0.019)
XIPt-1            0.027***        0.212**
                   (0.010)        (0.081)
Agentet             0.353          0.177
                   (0.297)        (0.377)
==============================================
==============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.1524, df = 5, p-value = 0.8277
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
==============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)             (2)
----------------------------------------------
Edadt              -0.011          -0.006
                   (0.009)        (0.012)
Años contratot     -0.011          -0.024
                   (0.010)        (0.015)
Eqipot             0.003**        -0.0002
                   (0.001)        (0.003)
XL2t              0.142***        0.036**
                   (0.043)        (0.013)
```

```
XL2t-1              0.057**          0.064
                    (0.022)         (0.043)
Agentet              0.358           0.177
                    (0.297)         (0.379)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.3385, df = 5, p-value = 0.8006
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt               -0.010          -0.002
                    (0.008)         (0.012)
Años contratot      -0.009          -0.026
                    (0.011)         (0.020)
Eqipot              0.003**          0.002
                    (0.001)         (0.004)
XDLt               -0.0001*       0.0003***
                   (0.0001)        (0.0001)
XLt-1               0.0002          0.0001
                   (0.0002)        (0.0002)
Agentet              0.308           0.026
                    (0.278)         (0.379)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 13.204, df = 5, p-value = 0.02154
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.010          -0.002
                     (0.009)         (0.012)
Años contratot       -0.017          -0.027
                     (0.011)         (0.020)
Eqipot               0.003**          0.001
                     (0.001)         (0.004)
XS2t                  0.001           0.001
                     (0.001)         (0.002)
XS2t-1                0.002           0.001
                     (0.001)         (0.002)
Agentet               0.324           0.044
                     (0.294)         (0.351)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.188, df = 5, p-value = 0.671
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.010          -0.008
                     (0.009)         (0.010)
Años contratot       -0.012          -0.007
                     (0.011)         (0.034)
Eqipot               0.002*           0.001
                     (0.001)         (0.004)
XSt                  -0.001           0.029*
                     (0.003)         (0.017)
XSt-1                 0.004          -0.007
                     (0.004)         (0.006)
Agentet               0.330           0.202
                     (0.290)         (0.282)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 2.1496, df = 5, p-value = 0.8281
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.006          -0.007
                     (0.008)         (0.009)
Años contratot       -0.011          -0.026
                     (0.013)         (0.018)
Eqipot               0.003*          -0.002
                     (0.001)         (0.006)
XSO2t                -0.006          0.038
                     (0.015)         (0.033)
XSO2t-1             -0.041***        0.002
                     (0.013)         (0.029)
Agentet               0.169          0.244
                     (0.272)         (0.277)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.7346, df = 5, p-value = 0.4491
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.008          -0.006
                     (0.008)         (0.010)
Años contratot       -0.014          -0.021
                     (0.012)         (0.015)
Eqipot               0.003**         -0.001
```

```
                    (0.001)         (0.005)
XSOt                -0.004           0.023
                    (0.017)         (0.034)
XSOt-1             -0.047**         -0.001
                    (0.018)         (0.026)
Agentet              0.250           0.192
                    (0.273)         (0.305)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.7543, df = 5, p-value = 0.3309
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.009           -0.003
                    (0.009)         (0.010)
Años contratot      -0.010           -0.019
                    (0.010)         (0.013)
Eqipot              0.003**          0.002
                    (0.001)         (0.005)
XWAR2t              0.0001           0.001*
                   (0.0003)         (0.001)
XWAR2t-1            0.0002           0.0002
                   (0.0003)         (0.001)
Agentet              0.290           0.027
                    (0.288)         (0.299)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.3346, df = 5, p-value = 0.275
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (Random Effects)
```

```
===============================================
                    Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               -0.010          -0.004
                    (0.009)         (0.011)
Años contratot      -0.011          -0.036
                    (0.012)         (0.021)
Eqipot              0.003*           0.004
                    (0.001)         (0.003)
XWARt                0.001           0.004
                    (0.003)         (0.003)
XWARt-1              0.001           0.008
                    (0.003)         (0.005)
Agentet              0.313           0.046
                    (0.307)         (0.369)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 6.3998, df = 5, p-value = 0.2692
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (Random Effects)
===============================================
                    Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               -0.009          -0.004
                    (0.009)         (0.011)
Años contratot      -0.003          -0.028
                    (0.012)         (0.022)
Eqipot              0.003**          0.001
                    (0.001)         (0.004)
XWHIP2t             -0.008           0.005
                    (0.005)         (0.007)
XWHIP2t-1           -0.0001          0.003
                    (0.005)         (0.010)
Agentet              0.257           0.096
                    (0.301)         (0.340)
===============================================
===============================================
```

```
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 9.2149, df = 5, p-value = 0.1008
alternative hypothesis: one model is inconsistent
```

First Differences

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```
# To Store results:
hitter_model_fd_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_hitter_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_h  <- paste(vars_fe, stat_hitter_t[[i]],
                       sep = '+')
  formula <- paste(base_vars_h,
                   stat_hitter_t_1[[i]],
                   sep = " + ")

  hitter_model_fd_fa[[i]] <- plm(formula, data = hitter_first_two,
                                 model = "fd",
                                 index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(hitter_model_fd_fa[[i]],
                              vcov = vcovHC(hitter_model_fd_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  h_m_first_d_f <- plm(formula, data = hitter_remaining,
                       model = "fd",
                       index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(h_m_first_d_f,
                              vcov = vcovHC(h_m_first_d_f,
                                            type = "HC1",
                                            cluster = "group"))
  # To store models
  h_m_first_d <- list(my_lm_cluster_i,my_lm_cluster_f)

  # Print the third block of results
  stargazer(h_m_first_d,
            no.space = TRUE,
            type = "text",
            title = "Bateadores regulares: Efecto de la edad (First Differences)",
```

```r
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = hitter_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(hitter_model_fd_fa[[i]],h_m_first_d_f))
}
```

```
Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.011         -0.016***
                    (0.009)         (0.0004)
Años contratot     -0.019**        -0.062***
                    (0.008)         (0.003)
Eqipot               0.001          0.006***
                    (0.001)         (0.001)
XABt                 0.001          0.003**
                    (0.001)         (0.001)
XABt-1               0.001           0.002*
                    (0.001)         (0.001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 4.4892, df = 5, p-value = 0.4813
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007         -0.015***
                    (0.008)         (0.001)
Años contratot     -0.018**        -0.082***
                    (0.009)         (0.004)
Eqipot               0.001          0.005***
```

```
                  (0.001)         (0.001)
XAB2t             -0.0001          0.001
                 (0.0001)        (0.0003)
XAB2t-1           0.00002          0.0001
                 (0.0001)        (0.0003)
================================================
================================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.652, df = 5, p-value = 0.8949
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
================================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
------------------------------------------------
Edadt                0.008        -0.016***
                    (0.009)        (0.0003)
Años contratot     -0.019**       -0.077***
                    (0.009)        (0.011)
Eqipot               0.001         0.005***
                    (0.001)        (0.001)
XHt                 -0.0002         0.004
                    (0.001)        (0.003)
XHt-1                0.001          0.002
                    (0.001)        (0.004)
================================================
================================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.2242, df = 5, p-value = 0.9425
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
================================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007        -0.015***
                    (0.008)        (0.0004)
Años contratot     -0.021**       -0.075***
                    (0.009)        (0.007)
Eqipot               0.002**        0.006***
                    (0.001)        (0.001)
XH2t                0.050***        -0.014
                    (0.019)        (0.025)
XH2t-1              0.071***      -0.039***
                    (0.025)        (0.006)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.28455, df = 5, p-value = 0.9979
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007        -0.015***
                    (0.008)        (0.001)
Años contratot     -0.018**       -0.071***
                    (0.008)        (0.012)
Eqipot               0.001          0.005***
                    (0.001)        (0.001)
XBAt                -0.020          -0.084
                    (0.050)        (0.071)
XBAt-1               0.041*          0.013
                    (0.023)        (0.024)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.4046, df = 5, p-value = 0.3685
```

alternative hypothesis: one model is inconsistent

Bateadores regulares: Efecto de la edad (First Differences)

	Dependent variable:	
	Primeros dos años	Años restantes
	(1)	(2)
Edadt	0.007	-0.015***
	(0.010)	(0.001)
Años contratot	-0.020**	-0.081***
	(0.009)	(0.010)
Eqipot	0.001	0.005***
	(0.001)	(0.001)
XBA2t	0.003	0.030***
	(0.004)	(0.006)
XBA2t-1	0.002	0.019**
	(0.003)	(0.008)
Note:	*p<0.1; **p<0.05; ***p<0.01	

[1] ""
[1] "Test para cambio estructural entre periodos:"

Hausman Test

data: formula
chisq = 9.1154, df = 5, p-value = 0.1045
alternative hypothesis: one model is inconsistent

Bateadores regulares: Efecto de la edad (First Differences)

	Dependent variable:	
	Primeros dos años	Años restantes
	(1)	(2)
Edadt	0.009	-0.016***
	(0.009)	(0.0004)
Años contratot	-0.018*	-0.069***
	(0.010)	(0.010)
Eqipot	0.001	0.006***
	(0.001)	(0.001)
XDt	-0.0005	0.007**
	(0.001)	(0.003)
XDt-1	0.001	0.007**
	(0.001)	(0.003)

```
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 5.0022, df = 5, p-value = 0.4156
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              --------------------------------

              Primeros dos años Años restantes
                    (1)              (2)
-----------------------------------------------
Edadt               0.011         -0.015***
                   (0.009)         (0.0004)
Años contratot     -0.019**       -0.081***
                   (0.008)         (0.010)
Eqipot              0.001          0.006***
                   (0.001)         (0.001)
XD2t                0.002           0.008*
                   (0.001)         (0.004)
XD2t-1              0.002           0.005*
                   (0.001)         (0.003)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.25077, df = 5, p-value = 0.9985
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              --------------------------------

              Primeros dos años Años restantes
                    (1)              (2)
-----------------------------------------------
Edadt               0.007         -0.015***
                   (0.008)         (0.001)
Años contratot     -0.023**       -0.078***
                   (0.009)         (0.007)
```

```
Eqipot              0.002**         0.006***
                    (0.001)         (0.0005)
XHRt                0.018**          0.017
                    (0.009)         (0.016)
XHRt-1              0.057**        -0.057***
                    (0.022)         (0.008)
================================================
================================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.70247, df = 5, p-value = 0.9828
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
================================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
------------------------------------------------
Edadt                0.008         -0.015***
                    (0.008)         (0.0005)
Años contratot     -0.023**        -0.079***
                    (0.009)         (0.008)
Eqipot              0.002**         0.006***
                    (0.001)         (0.0005)
XHR2t               0.061*           0.004
                    (0.035)         (0.033)
XHR2t-1            0.099***        -0.048***
                    (0.031)         (0.012)
================================================
================================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.857, df = 5, p-value = 0.03681
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
================================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.009         -0.015***
                    (0.008)         (0.001)
Años contratot     -0.022**        -0.071***
                    (0.010)         (0.012)
Eqipot             0.002***        0.006***
                    (0.001)         (0.001)
XGSt               0.158***         -0.029
                    (0.053)         (0.050)
XGSt-1               0.024         -0.052***
                    (0.023)         (0.012)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 8.9246, df = 5, p-value = 0.1121
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.008         -0.015***
                    (0.008)        (0.0003)
Años contratot     -0.018**        -0.088***
                    (0.009)         (0.009)
Eqipot               0.001         0.006***
                    (0.001)         (0.001)
XGS2t               -0.001          0.008
                    (0.001)         (0.005)
XGS2t-1             0.003*          0.006*
                    (0.001)         (0.003)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
```

```
chisq = 4.5016, df = 5, p-value = 0.4797
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)             (2)
-----------------------------------------------
Edadt               0.006        -0.012***
                   (0.009)        (0.001)
Años contratot     -0.018**      -0.072***
                   (0.009)        (0.013)
Eqipot              0.001         0.004***
                   (0.001)        (0.0005)
XOPSt               0.001        -0.045***
                   (0.013)        (0.008)
XOPSt-1             0.005         -0.015
                   (0.013)        (0.014)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 27.246, df = 5, p-value = 5.109e-05
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)             (2)
-----------------------------------------------
Edadt               0.006        -0.015***
                   (0.009)        (0.0005)
Años contratot     -0.017**      -0.035***
                   (0.009)        (0.004)
Eqipot              0.001         0.006***
                   (0.001)        (0.0005)
XOPS2t              0.002         0.120***
                   (0.004)        (0.010)
XOPS2t-1            0.004         0.026***
                   (0.005)        (0.002)
===============================================
```

```
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 47.959, df = 5, p-value = 3.621e-09
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               0.003          -0.025***
                   (0.008)          (0.001)
Años contratot     -0.024**        -0.076***
                   (0.009)          (0.008)
Eqipot              0.001*          0.007***
                   (0.001)          (0.001)
XOBPt              0.020***         0.054***
                   (0.007)          (0.004)
XOBPt-1             0.009           0.058***
                   (0.009)          (0.004)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.073, df = 5, p-value = 0.04995
alternative hypothesis: one model is inconsistent


Bateadores regulares: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt               0.005          -0.016***
                   (0.007)          (0.001)
Años contratot     -0.020*         -0.056***
```

```
                    (0.010)         (0.002)
Eqipot               0.001          0.005***
                    (0.001)         (0.001)
XOBP2t               0.004          0.063***
                    (0.005)         (0.013)
XOBP2t-1             0.008          -0.019**
                    (0.006)         (0.008)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 23.62, df = 5, p-value = 0.0002568
alternative hypothesis: one model is inconsistent
```

Starting pitcher

```r
# To Store results
fielder_model_fd_fa <- list()

# loop over the variables in var_hitter_list
for (i in 1:length(stat_fielder_t_1)){
  # run linear regression with grouped errors by country and robust errors
  base_vars_s  <- paste(vars_fe, stat_fielder_t[[i]],
                      sep = '+')
  formula <- paste(base_vars_s,
                   stat_fielder_t_1[[i]],
                   sep = " + ")

  fielder_model_fd_fa[[i]] <- plm(formula, data = starting_first_two,
                                  model = "fd",
                                  index = c("id", "Anio_ref"))

  my_lm_cluster_i <- coeftest(fielder_model_fd_fa[[i]],
                              vcov = vcovHC(fielder_model_fd_fa[[i]],
                                            type = "HC1",
                                            cluster = "group"))

  s_m_first_d_f <- plm(formula, data = starting_remaining,
                       model = "fd",
                       index = c("id", "Anio_ref"))

  my_lm_cluster_f <- coeftest(s_m_first_d_f,
                              vcov = vcovHC(s_m_first_d_f,
                                            type = "HC1",
                                            cluster = "group"))
  # To store models
  s_m_first_d <- list(my_lm_cluster_i,my_lm_cluster_f)
```

```r
  # Print the third block of results
  stargazer(s_m_first_d,
            no.space = TRUE,
            type = "text",
            title = "Lanzadores iniciales: Efecto de la edad (First Differences)",
            column.labels = c("Primeros dos años", "Años restantes"),
            covariate.labels = fielder_stats_long[[i]])

  # Hausman test:
  print("")
  print("Test para cambio estructural entre periodos:")
  print(phtest(fielder_model_fd_fa[[i]],s_m_first_d_f))
}
```

```
Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                      Dependent variable:
                ---------------------------------

                Primeros dos años Años restantes
                       (1)              (2)
-----------------------------------------------
Edadt                -0.004          0.070***
                     (0.016)         (0.022)
Años contratot        0.001          0.096***
                     (0.006)         (0.028)
Eqipot                0.002**         0.002
                     (0.001)         (0.001)
XH2t                -0.00004         -0.00005
                    (0.0001)        (0.00003)
XH2t-1               0.00000         -0.0001
                    (0.0001)         (0.0001)
===============================================
===============================================
Note:                 *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.5504, df = 5, p-value = 0.9072
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                      Dependent variable:
                ---------------------------------

                Primeros dos años Años restantes
                       (1)              (2)
-----------------------------------------------
```

```
Edadt                -0.005         0.054**
                     (0.012)        (0.022)
Años contratot     -0.020**         0.078**
                     (0.008)        (0.029)
Eqipot              0.003***        0.004***
                     (0.001)        (0.001)
XHt                 0.006***        -0.002**
                     (0.002)        (0.001)
XHt-1                -0.0001        0.003***
                     (0.001)        (0.001)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 13.252, df = 5, p-value = 0.02113
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.002         0.070**
                     (0.014)        (0.023)
Años contratot       -0.001         0.093**
                     (0.006)        (0.031)
Eqipot               0.002**         0.002
                     (0.001)        (0.002)
XR2t                 -0.0002        -0.00004
                    (0.0001)        (0.0001)
XR2t-1               0.0002         0.00002
                    (0.0001)        (0.0001)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.9911, df = 5, p-value = 0.8504
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.002          0.067**
                    (0.014)        (0.024)
Años contratot      -0.002          0.091**
                    (0.006)        (0.032)
Eqipot              0.002**         0.005**
                    (0.001)        (0.002)
XER2t                0.001          -0.002
                    (0.001)        (0.001)
XER2t-1             0.003**         0.004**
                    (0.001)        (0.002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.1871, df = 5, p-value = 0.9461
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.002          0.106***
                    (0.012)        (0.027)
Años contratot       0.008          0.138***
                    (0.007)        (0.035)
Eqipot               0.001          0.005***
                    (0.001)        (0.001)
XERt                0.020**        -0.023***
                    (0.008)        (0.007)
XERt-1              -0.012*         0.003***
                    (0.007)        (0.001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 8.394, df = 5, p-value = 0.1358
alternative hypothesis: one model is inconsistent
```

Lanzadores iniciales: Efecto de la edad (First Differences)

	Dependent variable:	
	Primeros dos años	Años restantes
	(1)	(2)
Edadt	0.003	0.055**
	(0.014)	(0.020)
Años contratot	-0.008	0.074**
	(0.007)	(0.027)
Eqipot	0.002**	0.003**
	(0.001)	(0.001)
XRt	0.003**	-0.002
	(0.001)	(0.001)
XRt-1	0.003**	0.003*
	(0.001)	(0.001)
Note:	*p<0.1; **p<0.05; ***p<0.01	

```
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.033692, df = 5, p-value = 1
alternative hypothesis: one model is inconsistent
```

Lanzadores iniciales: Efecto de la edad (First Differences)

	Dependent variable:	
	Primeros dos años	Años restantes
	(1)	(2)
Edadt	-0.005	0.084**
	(0.016)	(0.030)
Años contratot	-0.0001	0.113**
	(0.005)	(0.039)
Eqipot	0.002***	0.004*
	(0.001)	(0.002)
XComando2t	-0.003	-0.021**

```
                   (0.005)         (0.007)
XComando2t-1       0.00000         -0.002**
                  (0.00000)        (0.001)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.1627, df = 5, p-value = 0.9484
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
-----------------------------------------------
Edadt              -0.001          0.083***
                   (0.016)         (0.027)
Años contratot     -0.007          0.108***
                   (0.004)         (0.035)
Eqipot             0.002*           0.004
                   (0.001)         (0.003)
XComandot           0.017          -0.037***
                   (0.020)         (0.006)
XComandot-1        0.0003*          0.010
                  (0.0002)         (0.020)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.1662, df = 5, p-value = 0.8257
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)              (2)
```

```
----------------------------------------------
Edadt              -0.003         0.079***
                   (0.014)        (0.016)
Años contratot      0.001         0.103***
                   (0.007)        (0.022)
Eqipot            0.002***        0.004**
                   (0.001)        (0.001)
XControl2t         -0.073         0.258***
                   (0.043)        (0.020)
XControl2t-1      -0.044***      -0.390***
                   (0.016)        (0.030)
==============================================
==============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 20.599, df = 5, p-value = 0.000964
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
==============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
----------------------------------------------
Edadt              -0.001         0.043**
                   (0.012)        (0.014)
Años contratot     -0.003         0.071***
                   (0.007)        (0.018)
Eqipot            0.002***        0.010***
                   (0.001)        (0.001)
XControlt          -0.018        -0.034**
                   (0.029)        (0.013)
XControlt-1       -0.065*        -0.235***
                   (0.035)        (0.011)
==============================================
==============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.4391, df = 5, p-value = 0.6326
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)            (2)
-----------------------------------------------
Edadt               -0.003          0.003
                    (0.013)        (0.005)
Años contratot       0.004          -0.005
                    (0.007)        (0.007)
Eqipot             0.003***       -0.0005**
                    (0.001)        (0.0002)
XDominio2t          -0.020         -0.003***
                    (0.026)        (0.001)
XDominio2t-1       0.028***       -0.129***
                    (0.011)        (0.002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.387, df = 5, p-value = 0.003822
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                    Dependent variable:
              -------------------------------

              Primeros dos años Años restantes
                    (1)            (2)
-----------------------------------------------
Edadt               -0.005         -0.017***
                    (0.014)        (0.002)
Años contratot      -0.001         -0.022***
                    (0.007)        (0.003)
Eqipot              0.002**         0.002***
                    (0.001)        (0.0002)
XDominiot            0.002         -0.062***
                    (0.012)        (0.002)
XDominiot-1          0.017         -0.122***
                    (0.014)        (0.002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
```

```
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 25.985, df = 5, p-value = 8.982e-05
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.003         0.062**
                     (0.015)        (0.023)
Años contratot        0.001         0.074**
                     (0.006)        (0.029)
Eqipot               0.002**         0.002*
                     (0.001)        (0.001)
XERA2t               -0.0001       -0.0001***
                    (0.0001)       (0.00003)
XERA2t-1             0.0001        0.0002***
                    (0.0001)       (0.00003)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.313, df = 5, p-value = 0.6518
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                -0.0002        0.067**
                     (0.014)        (0.025)
Años contratot        0.002         0.089**
                     (0.008)        (0.033)
Eqipot              0.002***        0.003**
                     (0.001)        (0.001)
```

```
XERAt              -0.001           -0.001
                   (0.001)         (0.0005)
XERAt-1            0.002**         0.002***
                   (0.001)         (0.0004)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.4718, df = 5, p-value = 0.9163
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt              -0.003          0.067**
                   (0.014)         (0.022)
Años contratot     -0.001          0.091**
                   (0.007)         (0.030)
Eqipot            0.002***          0.001
                   (0.001)         (0.002)
XIP2t               0.001           -0.003
                   (0.001)         (0.002)
XIP2t-1            0.0004           -0.001
                   (0.001)         (0.003)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.0224, df = 5, p-value = 0.846
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
```

```
                     (1)             (2)
-----------------------------------------------
Edadt              -0.004         0.072***
                   (0.014)        (0.022)
Años contratot     -0.001         0.096***
                   (0.006)        (0.029)
Eqipot             0.002***       0.002**
                   (0.001)        (0.001)
XIPt               0.301***       0.090***
                   (0.004)        (0.003)
XIPt-1              0.014        -0.243***
                   (0.013)        (0.029)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.7209, df = 5, p-value = 0.8863
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                     (1)             (2)
-----------------------------------------------
Edadt              -0.004         0.075***
                   (0.014)        (0.021)
Años contratot     -0.001         0.101***
                   (0.006)        (0.028)
Eqipot             0.002**        0.003**
                   (0.001)        (0.001)
XL2t               0.191***       0.064***
                   (0.015)        (0.005)
XL2t-1              0.017        -0.109***
                   (0.028)        (0.021)
===============================================
===============================================
Note:              *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.1889, df = 5, p-value = 0.8224
alternative hypothesis: one model is inconsistent
```

```
Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.001         0.066**
                    (0.013)        (0.023)
Años contratot       0.006         0.083**
                    (0.008)        (0.030)
Eqipot             0.002***        0.003**
                    (0.001)        (0.001)
XDLt               -0.0001*       -0.0002***
                   (0.00005)      (0.00002)
XLt-1              -0.00004       0.0002***
                   (0.0001)       (0.00001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.3822, df = 5, p-value = 0.7941
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.003         0.066**
                    (0.014)        (0.024)
Años contratot      -0.009         0.081**
                    (0.009)        (0.032)
Eqipot             0.002***        0.003**
                    (0.001)        (0.001)
XS2t                 0.002         -0.001*
                    (0.001)        (0.0004)
XS2t-1              0.002**        0.002***
                    (0.001)        (0.0001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
```

```
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.2097, df = 5, p-value = 0.8194
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.003         0.080***
                    (0.013)        (0.025)
Años contratot       0.001         0.126***
                    (0.007)        (0.035)
Eqipot             0.002***         0.002
                    (0.001)        (0.001)
XSt                 -0.003          0.008
                    (0.002)        (0.005)
XSt-1               -0.001        -0.005***
                    (0.002)        (0.001)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.823, df = 5, p-value = 0.8731
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.007         0.044***
                    (0.013)        (0.009)
Años contratot       0.008         0.056***
                    (0.007)        (0.010)
Eqipot              0.002**        0.00001
```

```
                    (0.001)         (0.001)
XSO2t                0.013           0.034
                    (0.011)         (0.022)
XSO2t-1             -0.030***        -0.003
                    (0.011)         (0.006)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 3.1525, df = 5, p-value = 0.6765
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.003           0.048**
                    (0.013)         (0.020)
Años contratot       0.003           0.067**
                    (0.006)         (0.027)
Eqipot              0.002**          0.001
                    (0.001)         (0.001)
XSOt                 0.005           0.024**
                    (0.015)         (0.011)
XSOt-1              -0.047***        -0.003
                    (0.018)         (0.003)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 7.7591, df = 5, p-value = 0.17
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------
```

```
               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                0.0003         0.071***
                    (0.013)         (0.019)
Años contratot      -0.001          0.093***
                    (0.006)         (0.025)
Eqipot               0.002**         0.0004
                    (0.001)         (0.002)
XWAR2t               0.001**       -0.001***
                   (0.0003)         (0.0002)
XWAR2t-1             0.001**        -0.0004
                   (0.0002)         (0.0002)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 2.7943, df = 5, p-value = 0.7317
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               --------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt                 0.003         0.061**
                    (0.014)         (0.021)
Años contratot        0.001         0.082**
                    (0.008)         (0.029)
Eqipot               0.001*         0.005***
                    (0.001)         (0.001)
XWARt                0.005**       -0.004***
                    (0.002)         (0.001)
XWARt-1             0.006***        0.007***
                    (0.002)         (0.001)
===============================================
===============================================
Note:                *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 0.37273, df = 5, p-value = 0.996
```

```
alternative hypothesis: one model is inconsistent


Lanzadores iniciales: Efecto de la edad (First Differences)
===============================================
                     Dependent variable:
               -------------------------------

               Primeros dos años Años restantes
                      (1)             (2)
-----------------------------------------------
Edadt               -0.003         0.064**
                    (0.014)        (0.025)
Años contratot       0.003         0.076**
                    (0.009)        (0.033)
Eqipot              0.002**        0.004**
                    (0.001)        (0.001)
XWHIP2t             -0.004          -0.001
                    (0.005)        (0.002)
XWHIP2t-1            0.001         0.009***
                    (0.003)        (0.002)
===============================================
===============================================
Note:               *p<0.1; **p<0.05; ***p<0.01
[1] ""
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.0795, df = 5, p-value = 0.9559
alternative hypothesis: one model is inconsistent
```

Cambio en el poder de negociación al convertirse en agente

Obtendremos el estimador del cambio en el poder de negociación un periodo antes de que el jugador se convierta en agente libre con el primer periodo como agente libre. Importemos las bases de datos

```
setwd("~/Documentos/Github/Proyectos/MLB_HN/")
hitters_panel_ch <- read.csv('ETL_Data/Panel/Cumulative/Bargaining_change/panel_hitters_cum_ch.csv')
fielders_panel_ch <- read.csv('ETL_Data/Panel/Cumulative/Bargaining_change/panel_fielders_cum_ch.csv')
```

Por otro lado, se mostrarán las dimensiones de cada pánel

```
print("Bateadores: ")
```

```
[1] "Bateadores: "
```

```
print(dim(hitters_panel_ch))
```

```
[1] 592 199
```

```
print("")
```

```
[1] ""
```

```
print("Fildeadores: ")
```

```
[1] "Fildeadores: "
```

```
print(dim(fielders_panel_ch))
```

```
[1] 546 213
```

```
# Convert categorical column to numerical
hitters_panel_ch$position_num_t <- as.numeric(factor(hitters_panel_ch$Posicion_t))
fielders_panel_ch$position_num_t <- as.numeric(factor(fielders_panel_ch$Posicion_t))
hitters_panel_ch$team_num_t <- as.numeric(factor(hitters_panel_ch$Acronimo_t))
fielders_panel_ch$team_num_t <- as.numeric(factor(fielders_panel_ch$Acronimo_t))
```

Como adelanto, se descartaron los controles por posición puesto que no son significativos para los modelos y afectan los resultados. Tal vez por el hehco de que los jugadores tienden a rotar de posición en un mismo partido e incluso a lo largo de la temporada. aAgreguemos una columna de 1's que represente la dummy de ser agente libre

```
# add a column of 1s to the panel data
hitters_panel_ch <- cbind(hitters_panel_ch,
                          fa = rep(1, nrow(hitters_panel_ch)))
fielders_panel_ch <- cbind(fielders_panel_ch,
                           fa = rep(1, nrow(fielders_panel_ch)))
```

Segundo, crearemos las categorías de acuerdo a la especificación mencionada arriba

Tercero, concatenaremos estas bases de datos de acuerdo a los grupos señalados anteriormente

Procedamos con las estimaciones de forma directa, no conjunta, puesto que tenemos como objetivo probar que hay un aumento en el poder de negociación

Creemos la lista de variables sobre las cuáles se va a iterar el clico

Variables para los fildeadores

Las variables base para ambos tipos de jugadores son los controles

```
# Constroles:
vars  <- 'Y_Sueldo_regular_norm_t ~ Edad_t + Anios_de_contrato_t + team_num_t'
```

```
hitter_stats_1_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                       "$X_{AB_{t}}$","$X_{AB_{t-1}}$","$X_{AB^{2}_{t}}$","$X_{AB^{2}_{t-1}}$",
                       "$X_{H_{t}}$","$X_{H_{t-1}}$","$X_{H^{2}_{t}}$","$X_{H^{2}_{t-1}}$",
                       "$X_{BA_{t}}$","$X_{BA_{t-1}}$", "$X_{BA^{2}_{t}}$","$X_{BA^{2}_{t-1}}$",
                       "Agente$_{t}$")
hitter_stats_2_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                       "$X_{D_{t}}$","$X_{D_{t-1}}$","$X_{D^{2}_{t}}$","$X_{D^{2}_{t-1}}$",
```

```
                       "$X_{HR_{t}}$","$X_{HR_{t-1}}$","$X_{HR^{2}_{t}}$","$X_{HR^{2}_{t-1}}$",
                       "$X_{GS_{t}}$","$X_{GS_{t-1}}$", "$X_{GS^{2}_{t}}$","$X_{GS^{2}_{t-1}}$",
                       "Agente$_{t}$")
hitter_stats_3_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                       "$X_{OPS_{t}}$","$X_{OPS_{t-1}}$","$X_{OPS^{2}_{t}}$","$X_{OPS^{2}_{t-1}}$",
                       "$X_{OBP_{t}}$","$X_{OBP_{t-1}}$","$X_{OBP^{2}_{t}}$","$X_{OBP^{2}_{t-1}}$",
                       "$X_{SLG_{t}}$","$X_{SLG_{t-1}}$", "$X_{SLG^{2}_{t}}$","$X_{SLG^{2}_{t-1}}$",
                       "Agente$_{t}$")
hitter_stats_4_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                       "$X_{RBI_{t}}$","$X_{RBI_{t-1}}$","$X_{RBI^{2}_{t}}$","$X_{RBI^{2}_{t-1}}$",
                       "$X_{WAR_{t}}$","$X_{WAR_{t-1}}$", "$X_{WAR^{2}_{t}}$","$X_{WAR^{2}_{t-1}}$",
                       "Agente$_{t}$")
hitter_stats_ch <- list(hitter_stats_1_ch,
                         hitter_stats_2_ch,
                         hitter_stats_3_ch,
                         hitter_stats_4_ch)
# Cycles for loop
hitter_rep_ch <- 3
# Stats to show
hitter_stat_num <- 6
```

```
fielder_stats_1_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                        "$X_{H^{2}_{t}}$","$X_{H^{2}_{t-1}}$","$X_{H_{t}}$","$X_{H_{t-1}}$",
                        "$X_{R^{2}_{t}}$","$X_{R^{2}_{t-1}}$","$X_{ER^{2}_{t}}$","$X_{ER^{2}_{t-1}}$",
                        "$X_{ER_{t}}$","$X_{ER_{t-1}}$", "$X_{R_{t}}$","$X_{R_{t-1}}$",
                        "Agente$_{t}$")
fielder_stats_2_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                        "$X_{Comando^{2}_{t}}$","$X_{Comando^{2}_{t-1}}$","$X_{Comando_{t}}$","$X_{Comar
                        "$X_{Control^{2}_{t}}$","$X_{Control^{2}_{t-1}}$","$Control_{H_{t}}$","$X_{Cont:
                        "$X_{Dominio^{2}_{t}}$","$X_{Dominio^{2}_{t-1}}$","$X_{Dominio_{t}}$","$X_{Domi
                        "Agente$_{t}$")
fielder_stats_3_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                        "$X_{ERA^{2}_{t}}$","$X_{ERA^{2}_{t-1}}$","$X_{ERA_{t}}$","$X_{ERA_{t-1}}$",
                        "$X_{IP^{2}_{t}}$","$X_{IP^{2}_{t-1}}$","$X_{IP_{t}}$","$X_{IP_{t-1}}$",
                        "$X_{L^{2}_{t}}$","$X_{L^{2}_{t-1}}$", "$X_{L_{t}}$","$X_{L_{t-1}}$",
                        "Agente$_{t}$")
fielder_stats_4_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                        "$X_{SO^{2}_{t}}$","$X_{SO^{2}_{t-1}}$","$X_{SO_{t}}$","$X_{SO_{t-1}}$",
                        "$X_{WAR^{2}_{t}}$","$X_{WAR^{2}_{t-1}}$","$X_{WAR_{t}}$","$X_{WAR_{t-1}}$",
                        "$X_{WHIP^{2}_{t}}$","$X_{WHIP^{2}_{t-1}}$","$X_{WHIP_{t}}$","$X_{WHIP_{t-1}}$"
                        "Agente$_{t}$")
fielder_stats_5_ch = c("$Edad_{t}$" , "Años contrato$_{t}$", "Eqipo$_{t}$",
                        "$X_{BB^{2}_{t}}$","$X_{BB^{2}_{t-1}}$","$X_{BB_{t}}$","$X_{BB_{t-1}}$",
                        "Agente$_{t}$")
fielder_stats_ch <- list(fielder_stats_1_ch,
                          fielder_stats_2_ch,
                          fielder_stats_3_ch,
                          fielder_stats_4_ch,
                          fielder_stats_5_ch)
# Cycles for loop
fielder_rep_ch <- 4
# Stats to show
fielder_stat_num <- 6
```

Pooling

Bateadores

Se obtendrán las estimaciones de las variables referentes a estadísticas deportivas sin controles

```
# Create a model to store the results
hitter_simple_pooling_ch <- list()

# To store the results
hitter_results_simple_pooling_1_ch <- list()
hitter_results_simple_pooling_2_ch <- list()
hitter_results_simple_pooling_3_ch <- list()
hitter_results_simple_pooling_4_ch <- list()
hitter_results_simple_pooling_ch <- list(result_1 = hitter_results_simple_pooling_1_ch,
                                          result_2 = hitter_results_simple_pooling_2_ch,
                                          result_3 = hitter_results_simple_pooling_3_ch,
                                          result_4 = hitter_results_simple_pooling_4_ch)

# Loop over the variables in var_hitter_list
for (j in 1:hitter_rep_ch){

  for (i in 1:hitter_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_hitter_t_ch[[i + hitter_stat_num*(j - 1)]],
                        sep = '+')
    formula <- paste(base_vars_h,
                     stat_hitter_t_1_ch[[i + hitter_stat_num*(j - 1)]],
                     sep = " + ")

    hitter_simple_pooling_ch[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = hitter_data_ch,
                                                                  model = "pooling",
                                                                  index = c("id", "Anio_ref"))

    hitter_results_simple_pooling_ch[[j]][[i]] <- coeftest(hitter_simple_pooling_ch[[i + hitter_stat_nu
                                                        vcov = vcovHC(hitter_simple_pooling_ch[[i + hit
                                                                      type = "HC1",
                                                                      cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_pooling_ch[[j]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Modelo Pooling",
          covariate.labels = hitter_stats_ch[[j]])

  # For last variables:
  if (j == 3){
    for (i in 1:4){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_hitter_t_ch[[i + hitter_stat_num*(j)]],
                        sep = '+')
    formula <- paste(base_vars_h,
```

```
                      stat_hitter_t_1_ch[[i + hitter_stat_num*(j)]],
                      sep = " + ")

    hitter_simple_pooling_ch[[i + hitter_stat_num*(j)]] <- plm(formula, data = hitter_data_ch,
                                                               model = "pooling",
                                                               index = c("id", "Anio_ref"))

    hitter_results_simple_pooling_ch[[4]][[i]] <- coeftest(hitter_simple_pooling_ch[[i + hitter_stat_nu
                                                            vcov = vcovHC(hitter_simple_pooling_ch[[i +
                                                                          type = "HC1",
                                                                          cluster = "group"))
  }

  # Print the third block of results
  stargazer(hitter_results_simple_pooling_ch[[4]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Modelo Pooling",
          covariate.labels = hitter_stats_ch[[4]])
  }
}
```

```
Bateadores: Modelo Pooling
=================================================================
                              Dependent variable:
               --------------------------------------------------

                 (1)     (2)      (3)     (4)      (5)     (6)
-----------------------------------------------------------------
Edadt          -0.006  -0.007  -0.007   -0.007  -0.007  -0.007
               (0.004) (0.004)  (0.005) (0.004)  (0.004) (0.004)
Años contratot -0.006  -0.005  -0.005   -0.006  -0.006  -0.006
               (0.008) (0.008)  (0.008) (0.008)  (0.008) (0.008)
Eqipot          0.001   0.002    0.002   0.002    0.002   0.002
               (0.001) (0.001)  (0.001) (0.001)  (0.001) (0.001)
XABt           -0.002
               (0.001)
XABt-1         0.002**
               (0.001)
XAB2t                  -0.00005
                       (0.0001)
XAB2t-1                0.00004
                       (0.0001)
XHt                             -0.001
                                (0.002)
XHt-1                            0.001
                                (0.002)
XH2t                                    -0.0003*
                                        (0.0002)
XH2t-1                                  0.0003*
                                        (0.0002)
XBAt                                              0.006
                                                 (0.032)
```

	(1)	(2)	(3)	(4)	(5)	(6)
XBAt-1					0.045	
					(0.034)	
XBA2t						0.032
						(0.030)
XBA2t-1						-0.007
						(0.050)
Agentet	0.166	0.181	0.191	0.176	0.183	0.190
	(0.142)	(0.146)	(0.151)	(0.143)	(0.149)	(0.149)

Note: *p<0.1; **p<0.05; ***p<0.01

Bateadores: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.007	-0.007	-0.007	-0.007	-0.006	-0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Años contratot	-0.006	-0.005	-0.004	-0.005	-0.005	-0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Eqipot	0.002	0.002	0.002	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XDt	-0.0001					
	(0.005)					
XDt-1	0.003					
	(0.004)					
XD2t		-0.0002				
		(0.001)				
XD2t-1		0.0002				
		(0.001)				
XHRt			-0.009*			
			(0.005)			
XHRt-1			0.008			
			(0.006)			
XHR2t				-0.001		
				(0.001)		
XHR2t-1				0.0003		
				(0.001)		
XGSt					-0.003	
					(0.002)	
XGSt-1					0.003	
					(0.002)	
XGS2t						-0.0005**
						(0.0002)
XGS2t-1						0.0004*
						(0.0002)
Agentet	0.186	0.185	0.166	0.182	0.166	0.175
	(0.149)	(0.149)	(0.145)	(0.148)	(0.144)	(0.143)

Note: *p<0.1; **p<0.05; ***p<0.01

Bateadores: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	-0.007	-0.007	-0.007	-0.007	-0.007	-0.007
	(0.005)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Años contratot	-0.006	-0.007	-0.005	-0.006	-0.006	-0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Eqipot	0.001	0.002	0.002	0.002	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
XOPSt	0.022					
	(0.021)					
XOPSt-1	0.006					
	(0.020)					
XOPS2t		0.004				
		(0.019)				
XOPS2t-1		0.026				
		(0.020)				
XOBPt			0.024			
			(0.032)			
XOBPt-1			0.013			
			(0.035)			
XOBP2t				0.016		
				(0.034)		
XOBP2t-1				0.064		
				(0.051)		
XSLGt					0.029	
					(0.030)	
XSLGt-1					0.010	
					(0.026)	
XSLG2t						0.022
						(0.038)
XSLG2t-1						0.011
						(0.032)
Agentet	0.177	0.176	0.183	0.188	0.173	0.181
	(0.151)	(0.149)	(0.148)	(0.148)	(0.152)	(0.150)
Note:	*p<0.1; **p<0.05; ***p<0.01					

Bateadores: Modelo Pooling

	Dependent variable:			
	(1)	(2)	(3)	(4)
Edadt	-0.007	-0.007	-0.007	-0.007
	(0.005)	(0.004)	(0.004)	(0.005)
Años contratot	-0.005	-0.004	-0.007	-0.006

```
                (0.008) (0.008)  (0.008) (0.008)
Eqipot           0.002   0.002    0.002   0.002
                (0.001) (0.001)  (0.001) (0.001)
XRBIt           -0.001
                (0.003)
XRBIt-1         0.0001
                (0.003)
XRBI2t                  -0.001*
                        (0.0003)
XRBI2t-1                 0.0005
                        (0.0004)
XWARt                             0.004
                                 (0.013)
XWARt-1                          0.024*
                                 (0.012)
XWAR2t                                    0.003
                                         (0.008)
XWAR2t-1                                  0.005
                                         (0.006)
Agentet          0.191   0.181    0.197   0.191
                (0.152) (0.142)  (0.147) (0.149)
================================================
================================================
Note:                 *p<0.1; **p<0.05; ***p<0.01
```

Ahora evaluaremos los cambios estructurales compararemos los modelos estimados para los periodos de cambio en comparación con los primeros dos años de agente libre

Hitter

```r
# To store results:
hitter_model_pooling_ch <- list()
compare_list <- c("X_Triples_t","X_Triples_2_t")

# Extract the desired substrings using regular expressions and gsub()
hitter_names <- gsub("^X_(.*)_(t)$", "\\1", stat_hitter_t)

# loop over the variables in var_hitter_list
for (i in 1:length(stat_hitter_t)){

  # Exclude stats
  if(!(stat_hitter_t[[i]] %in% compare_list)){

    # run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_hitter_t[[i]],
                    sep = '+')
    formula <- paste(base_vars_h,
                  stat_hitter_t_1[[i]],
                  sep = " + ")

    hitter_model_pooling_ch[[i]] <- plm(formula, data = hitter_data_ch,
                                    model = "pooling",
```

```
                                        index = c("id", "Anio_ref"))

    # Hausman test:
    print("")
    print(hitter_names[[i]])
    print("Test para cambio estructural entre periodos:")
    print(phtest(hitter_model_pooling_ch[[i]],
                 hitter_model_pooling_fa[[i]]))
  }
}
```

```
[1] ""
[1] "At_bats"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 59.168, df = 5, p-value = 1.805e-11
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Bateos_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 18.707, df = 5, p-value = 0.002179
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Bateos"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.385, df = 5, p-value = 0.04426
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Bateos_promedio"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 11.884, df = 5, p-value = 0.03642
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Bateos_promedio_2"
```

```
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 8.2914, df = 5, p-value = 0.1409
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Home_runs"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 21.733, df = 5, p-value = 0.0005885
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Home_runs_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 12.028, df = 5, p-value = 0.0344
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Juegos_iniciados"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 73.223, df = 5, p-value = 2.184e-14
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Porcentaje_On_base_plus_slugging"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 721.14, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Porcentaje_on_base"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 5.0247, df = 5, p-value = 0.4129
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Porcentaje_on_base_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 9.2569, df = 5, p-value = 0.09924
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Runs_batted_in"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 65.011, df = 5, p-value = 1.115e-12
alternative hypothesis: one model is inconsistent

[1] ""
[1] "WAR"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 9.4941, df = 5, p-value = 0.09091
alternative hypothesis: one model is inconsistent

[1] ""
[1] "WAR_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 10.736, df = 5, p-value = 0.05687
alternative hypothesis: one model is inconsistent
```

Starting pitcher

```
# Create a model to store the results
fielder_simple_pooling_ch <- list()

# To store the results
fielder_results_simple_pooling_1_ch <- list()
fielder_results_simple_pooling_2_ch <- list()
```

```
fielder_results_simple_pooling_3_ch <- list()
fielder_results_simple_pooling_4_ch <- list()
fielder_results_simple_pooling_5_ch <- list()
fielder_results_simple_pooling_ch <- list(result_1 = fielder_results_simple_pooling_1_ch,
                                           result_2 = fielder_results_simple_pooling_2_ch,
                                           result_3 = fielder_results_simple_pooling_3_ch,
                                           result_4 = fielder_results_simple_pooling_4_ch,
                                           result_5 = fielder_results_simple_pooling_5_ch)

# Loop over the variables in var_hitter_list
for (j in 1:fielder_rep_ch){

  for (i in 1:fielder_stat_num){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_fielder_t_ch[[i + fielder_stat_num*(j - 1)]],
                        sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1_ch[[i + fielder_stat_num*(j - 1)]],
                     sep = " + ")

    fielder_simple_pooling_ch[[i + hitter_stat_num*(j - 1)]] <- plm(formula, data = starting_data_ch,
                                                                    model = "pooling",
                                                                    index = c("id", "Anio_ref"))

    fielder_results_simple_pooling_ch[[j]][[i]] <- coeftest(fielder_simple_pooling_ch[[i + fielder_stat_
                                                             vcov = vcovHC(fielder_simple_pooling_ch[[i
                                                                           type = "HC1",
                                                                           cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_pooling_ch[[j]],
            no.space = TRUE,
            type = "text",
            title = "Lanzadores Iniciales: Modelo Pooling",
            covariate.labels = fielder_stats_ch[[j]])

  # For last variables:
  if (j == 4){
    for (i in 1:2){
    # Run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_fe, stat_fielder_t_ch[[i + fielder_stat_num*(j)]],
                        sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1_ch[[i + fielder_stat_num*(j)]],
                     sep = " + ")

    fielder_simple_pooling_ch[[i + fielder_stat_num*(j)]] <- plm(formula, data = starting_data_ch,
                                                                 model = "pooling",
                                                                 index = c("id", "Anio_ref"))

    fielder_results_simple_pooling_ch[[5]][[i]] <- coeftest(fielder_simple_pooling_ch[[i + fielder_stat_
                                                            vcov = vcovHC(fielder_simple_pooling_ch[[i +
```

```r
                                                                                        type = "HC1",
                                                                                        cluster = "group"))
  }

  # Print the third block of results
  stargazer(fielder_results_simple_pooling_ch[[5]],
          no.space = TRUE,
          type = "text",
          title = "Bateadores: Modelo Pooling",
          covariate.labels = fielder_stats_ch[[5]])
  }
}
```

```
Lanzadores Iniciales: Modelo Pooling
=================================================================
                                Dependent variable:
               --------------------------------------------------

                 (1)      (2)     (3)      (4)      (5)     (6)
-----------------------------------------------------------------
Edadt           0.001   0.0001   0.0002   0.0002  -0.0002 -0.0003
               (0.002)  (0.002) (0.002)  (0.002)  (0.002) (0.002)
Años contratot  -0.012  -0.013   -0.012   -0.012  -0.011  -0.010
               (0.011)  (0.011) (0.011)  (0.011)  (0.012) (0.012)
Eqipot          0.0002   0.001   0.001    0.001    0.001   0.001
               (0.002)  (0.002) (0.002)  (0.002)  (0.002) (0.002)
XH2t           -0.0001
               (0.0002)
XH2t-1          0.0002
               (0.0002)
XHt                      0.002
                        (0.003)
XHt-1                    0.002
                        (0.002)
XR2t                             0.0004
                                (0.0004)
XR2t-1                           0.0002
                                (0.0004)
XER2t                                     0.001
                                         (0.0005)
XER2t-1                                  0.00003
                                         (0.0004)
XERt                                               0.005
                                                  (0.005)
XERt-1                                             0.001
                                                  (0.004)
XRt                                                         0.006
                                                           (0.005)
XRt-1                                                       0.001
                                                           (0.004)
=================================================================
=================================================================
Note:                                 *p<0.1; **p<0.05; ***p<0.01
```

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	0.0003	0.001	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Años contratot	-0.009	-0.008	-0.013	-0.008	-0.012	-0.012
	(0.012)	(0.011)	(0.011)	(0.010)	(0.012)	(0.011)
Eqipot	0.001	-0.0003	-0.001	-0.002	0.0002	-0.00001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XComando2t	0.003					
	(0.009)					
XComando2t-1	-0.006					
	(0.008)					
XComandot		-0.009				
		(0.016)				
XComandot-1		0.027*				
		(0.016)				
XControl2t			0.041			
			(0.062)			
XControl2t-1			-0.296***			
			(0.106)			
ControlHt				0.026		
				(0.047)		
XControlt-1				-0.189***		
				(0.048)		
XDominio2t					0.031	
					(0.033)	
XDominio2t-1					0.051	
					(0.042)	
XDominiot						0.012
						(0.031)
XDominiot-1						0.056*
						(0.033)
Note:	*p<0.1; **p<0.05; ***p<0.01					

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	0.0004	0.0005	0.001	0.001	0.001	0.0003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Años contratot	-0.008	-0.013	-0.014	-0.013	-0.009	-0.012
	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)
Eqipot	0.001	0.001	0.0003	0.0004	-0.0001	0.0001

	(1)	(2)	(3)	(4)	(5)	(6)
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XERA2t	0.008*					
	(0.004)					
XERA2t-1	-0.004					
	(0.006)					
XERAt		0.019*				
		(0.011)				
XERAt-1		-0.022*				
		(0.012)				
XIP2t			-0.0003			
			(0.0002)			
XIP2t-1			0.0003**			
			(0.0001)			
XIPt				0.0001		
				(0.003)		
XIPt-1				0.003		
				(0.002)		
XL2t					0.007**	
					(0.003)	
XL2t-1					-0.005*	
					(0.003)	
XLt						0.030***
						(0.011)
XLt-1						-0.017*
						(0.010)

Note: *p<0.1; **p<0.05; ***p<0.01

Lanzadores Iniciales: Modelo Pooling

	Dependent variable:					
	(1)	(2)	(3)	(4)	(5)	(6)
Edadt	0.0004	0.0002	0.001	0.001	0.0005	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Años contratot	-0.013	-0.014	-0.011	-0.014	-0.008	-0.009
	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
Eqipot	0.001	0.001	0.001	0.0002	0.001	-0.0002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
XSO2t	-0.0001					
	(0.0002)					
XSO2t-1	0.0004***					
	(0.0001)					
XSOt		-0.0002				
		(0.003)				
XSOt-1		0.005**				
		(0.002)				
XWAR2t			-0.004			
			(0.011)			
XWAR2t-1			0.007			
			(0.004)			

```
XWARt                                      0.025
                                          (0.020)
XWARt-1                                    0.019
                                          (0.018)
XWHIP2t                                            0.020
                                                  (0.019)
XWHIP2t-1                                          0.002
                                                  (0.021)
XWHIPt                                                     0.024
                                                          (0.020)
XWHIPt-1                                                  -0.030
                                                          (0.022)
================================================================
================================================================
Note:                                *p<0.1; **p<0.05; ***p<0.01
```

```
Bateadores: Modelo Pooling
===========================================
                   Dependent variable:
               ----------------------------

                    (1)            (2)
-------------------------------------------
Edadt              0.001         0.0003
                  (0.002)        (0.002)
Años contratot     -0.011        -0.011
                  (0.011)        (0.011)
Eqipot            0.00003        0.0005
                  (0.002)        (0.002)
XBB2t             -0.0002
                  (0.001)
XBB2t-1            0.001
                  (0.0005)
XBBt                              0.003
                                 (0.005)
XBBt-1                            0.002
                                 (0.004)
===========================================
===========================================
Note:           *p<0.1; **p<0.05; ***p<0.01
```

```r
# To store results:
fielder_model_pooling_ch <- list()
compare_list <- c("X_Saves_t","X_Saves_2_t")

# Extract the desired substrings using regular expressions and gsub()
fielder_names <- gsub("^X_(.*)_(t)$", "\\1", stat_fielder_t)

# loop over the variables in var_hitter_list
for (i in 1:length(stat_fielder_t)){

  # Exclude stats
  if(!(stat_fielder_t[[i]] %in% compare_list)){
```

```r
    # run linear regression with grouped errors by country and robust errors
    base_vars_h  <- paste(vars_ms, stat_fielder_t[[i]],
                          sep = '+')
    formula <- paste(base_vars_h,
                     stat_fielder_t_1[[i]],
                     sep = " + ")

    fielder_model_pooling_ch[[i]] <- plm(formula, data = starting_data_ch,
                                         model = "pooling",
                                         index = c("id", "Anio_ref"))

    # Hausman test:
    print("")
    print(fielder_names[[i]])
    print("Test para cambio estructural entre periodos:")
    print(phtest(fielder_model_pooling_ch[[i]],
                 fielder_model_pooling_fa[[i]]))
  }
}
```

```
[1] ""
[1] "Bateos_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 112.41, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Bateos"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 68.033, df = 5, p-value = 2.629e-13
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Carreras_ganadas_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 40.822, df = 5, p-value = 1.019e-07
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Carreras_ganadas"
[1] "Test para cambio estructural entre periodos:"
```

```
    Hausman Test

data:  formula
chisq = 4.0421, df = 5, p-value = 0.5434
alternative hypothesis: one model is inconsistent

[1] ""
[1] "ERA"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 106.44, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Carreras"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 28.166, df = 5, p-value = 3.378e-05
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Comando_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1.3237, df = 5, p-value = 0.9325
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Comando"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 17.236, df = 5, p-value = 0.004074
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Control_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
```

```
chisq = 291.17, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Control"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 210.26, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Dominio_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 10.813, df = 5, p-value = 0.05521
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Dominio"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 18.944, df = 5, p-value = 0.001969
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Inning_pitched_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 98.225, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Inning_pitched"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 91.178, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
```

```
[1] "Losses_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 119.05, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Strike_outs_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1490.6, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Strike_outs"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 65.845, df = 5, p-value = 7.484e-13
alternative hypothesis: one model is inconsistent

[1] ""
[1] "WAR_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 46.886, df = 5, p-value = 5.993e-09
alternative hypothesis: one model is inconsistent

[1] ""
[1] "WHIP_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 29.987, df = 5, p-value = 1.483e-05
alternative hypothesis: one model is inconsistent

[1] ""
[1] "WHIP"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test
```

```
data:  formula
chisq = 231.55, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Walks_2"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 1425.3, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Walks"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 35.3, df = 5, p-value = 1.311e-06
alternative hypothesis: one model is inconsistent

[1] ""
[1] "Wins"
[1] "Test para cambio estructural entre periodos:"

    Hausman Test

data:  formula
chisq = 586.52, df = 5, p-value < 2.2e-16
alternative hypothesis: one model is inconsistent
```

Efectos aleatorios

POr definición, necesitamos más de un periodo de observación. Por lo tanto, no obtendremos dicho modelo por esa restricción.

Efectos aleatorios

Son equivalentes al pooling debido a que solo obtenemos la estimación para un periodo.

First Differences

Presenta las mismas restricciones que el estimador *within*.

Differences in Differences

Análogo a la sección anterior, importemos las bases de datos correspondientes

```r
setwd("~/Documentos/Github/Proyectos/MLB_HN/")
hitters_panel_did <- read.csv('ETL_Data/Panel/Cumulative/Bargaining_change/panel_hitters_cum_did.csv')
fielders_panel_did <- read.csv('ETL_Data/Panel/Cumulative/Bargaining_change/panel_fielders_cum_did.csv')
```

Por otro lado, se mostrarán las dimensiones de cada pánel

```r
print("Bateadores: ")
```

```
[1] "Bateadores: "
```

```r
print(dim(hitters_panel_did))
```

```
[1] 1852  200
```

```r
print("")
```

```
[1] ""
```

```r
print("Fildeadores: ")
```

```
[1] "Fildeadores: "
```

```r
print(dim(fielders_panel_did))
```

```
[1] 1789  214
```

```r
# Convert categorical column to numerical
hitters_panel_did$position_num_t <- as.numeric(factor(hitters_panel_did$Posicion_t))
fielders_panel_did$position_num_t <- as.numeric(factor(fielders_panel_did$Posicion_t))
hitters_panel_did$team_num_t <- as.numeric(factor(hitters_panel_did$Acronimo_t))
fielders_panel_did$team_num_t <- as.numeric(factor(fielders_panel_did$Acronimo_t))
```

Como adelanto, se descartaron los controles por posición puesto que no son significativos para los modelos y afectan los resultados. Tal vez por el hehco de que los jugadores tienden a rotar de posición en un mismo partido e incluso a lo largo de la temporada. aAgreguemos una columna de 1's que represente la dummy de ser agente libre

```r
# add a column of 1s to the panel data
hitters_panel_did <- cbind(hitters_panel_did,
                           fa = rep(1, nrow(hitters_panel_did)))
fielders_panel_did <- cbind(fielders_panel_did,
                            fa = rep(1, nrow(fielders_panel_did)))
```

Segundo, crearemos las categorías de acuerdo a la especificación mencionada arriba

Tercero, concatenaremos estas bases de datos de acuerdo a los grupos señalados anteriormente

Ahora, estimare el modelo DID para múltiples años. En este caso, ya contamos con una columna que tiene los años escalados de manera adecuada para indicar con 0 el primer año de tratamiento.

Obtengamos el efecto promedio de convertirse en agentes libres

```r
# Convert panel_data to a plm data object
plm_data <- pdata.frame(hitter_data_did,
                        index = c("Jugador","Anio_ref"))

# Specify the formula using as.formula
formula <- as.formula("Y_Sueldo_regular_norm_t ~ treatment * factor(Anio_did >= 0) + Anios_de_contrato_t

# Estimate DID model with multiple periods
hitter_did_model <- plm(formula,
                         data = plm_data,
                         model = "within")

# Group standard errors:
hitter_did_results <- coeftest(hitter_did_model,
                               vcov = vcovHC(hitter_did_model,
                                             type = "HC1",
                                             cluster = "group"))

# Print the third block of results
stargazer(hitter_did_results,
          no.space = TRUE,
          type = "text",
          title = "Bateadores regulares: Y DID",
          covariate.labels = c("Tratamiento", "Agent_period$_{t}$",
                               "Anios_contrato$_{t}$",
                               "Edad$_{t}$", "Equipo$_{t}$",
                               "ATE"))
```

```
Bateadores regulares: Y DID
=======================================
                Dependent variable:
            ---------------------------

---------------------------------------
Tratamiento           0.058*
                      (0.032)
Agentt               -0.064***
                      (0.014)
Aniost                0.003
                      (0.004)
Edadt                -0.010***
                      (0.002)
Equipot               0.0005
                      (0.001)
ATE                  -0.018
                      (0.034)
=======================================
=======================================
Note:       *p<0.1; **p<0.05; ***p<0.01
```

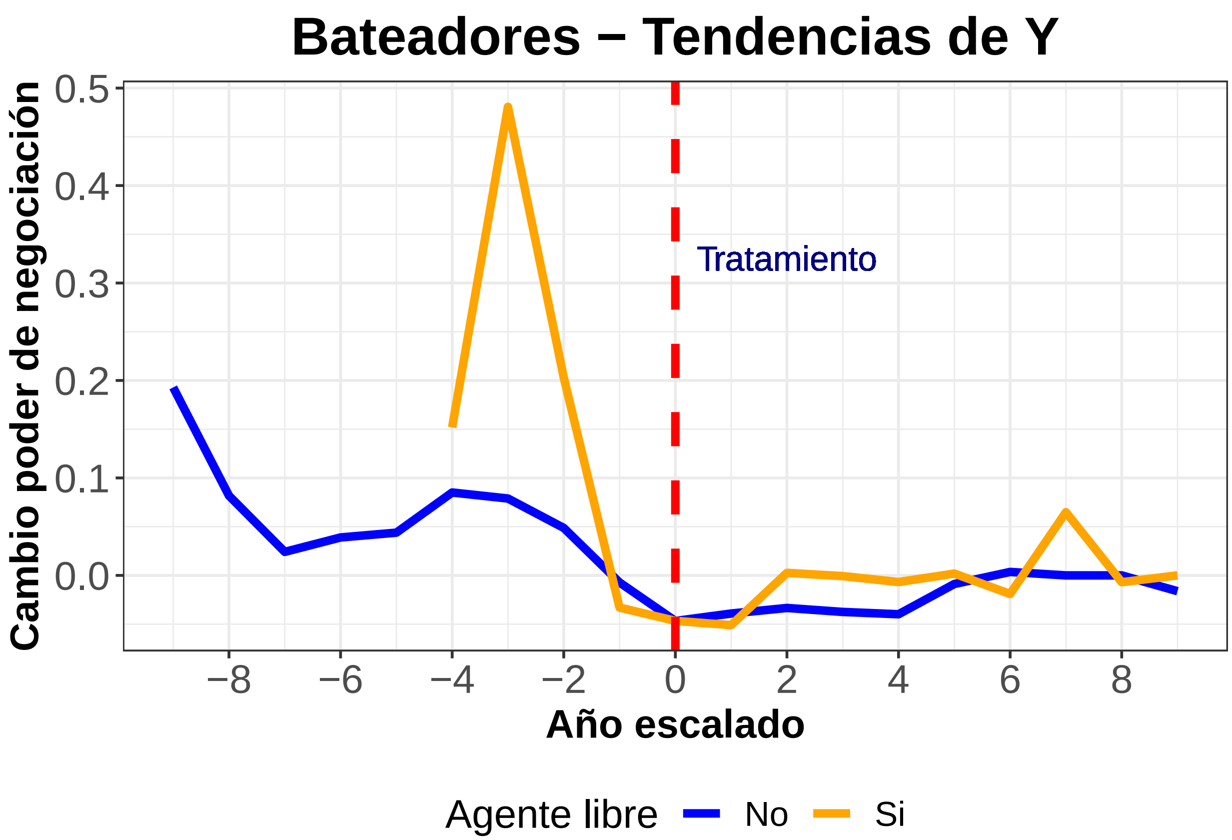
```r
# Convert panel_data to a plm data object
plm_data <- pdata.frame(starting_data_did,
                        index = c("Jugador","Anio_ref"))
```

```r
# Specify the formula using as.formula
formula <- as.formula("Y_Sueldo_regular_norm_t ~ treatment * factor(Anio_did >= 0) + Anios_de_contrato_t

# Estimate DID model with multiple periods
starting_did_model <- plm(formula,
                          data = plm_data,
                          model = "within")


# Group standard errors:
starting_did_results <- coeftest(starting_did_model,
                                 vcov = vcovHC(starting_did_model,
                                               type = "HC1",
                                               cluster = "group"))

# Print the third block of results
stargazer(starting_did_results,
          no.space = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: Y DID",
          covariate.labels = c("Tratamiento", "Agent_period$_{t}$",
                               "Anios_contrato$_{t}$",
                               "Edad$_{t}$", "Equipo$_{t}$",
                               "ATE"))
```

```
Lanzadores Iniciales: Y DID
=======================================
                Dependent variable:
            ---------------------------

---------------------------------------
Tratamiento            0.027
                      (0.054)
Agentt               -0.051**
                      (0.023)
Aniost                -0.003
                      (0.004)
Edadt                -0.013***
                      (0.004)
Equipot                0.001
                      (0.001)
ATE                    0.034
                      (0.058)
=======================================
=======================================
Note:       *p<0.1; **p<0.05; ***p<0.01
```

```r
# Create a data frame with outcome variable, treatment indicator, and time variable
parallel_data <- data.frame(Y_Sueldo_regular_norm_t = hitter_data_did$Y_Sueldo_regular_norm_t,
                            Tratamiento = hitter_data_did$Tratamiento,
                            Anio_did = hitter_data_did$Anio_did)

# Calculate mean outcome for treatment and control groups at each time period
```

```
parallel_means <- aggregate(Y_Sueldo_regular_norm_t ~ Tratamiento + Anio_did, data = parallel_data, FUN

# Create plot
ggplot(data = parallel_means,
       aes(x = Anio_did, y = Y_Sueldo_regular_norm_t, color = Tratamiento)) +
  geom_line(size = 1.5) +
  ggtitle("Bateadores - Tendencias de Y") +
  xlab("Año escalado") +
  ylab('Cambio poder de negociación') +
  scale_color_manual(values = c("blue", "orange")) +
  theme_bw() +
  geom_vline(xintercept = 0,
             linetype = "dashed",
             color = "red",
             size = 1.5) +
  theme(
    #Título de los ejes:
    axis.title.x = element_text(color = "Black",
                                size = 15,
                                face = "bold"),
    axis.title.y = element_text(color="Black",
                                size = 15,
                                face = "bold"),

    #Texto de los ejes:
    axis.text.x = element_text(size = 15),
    axis.text.y = element_text(size = 15),

    #T?tulo del gr?fico:
    plot.title = element_text(color = "Black",
                              size = 20,
                              hjust = 0.5,
                              face = "bold"),

    #T?tulo de la Leyenda:
    legend.title = element_text(size = 15),

    #Texto de la Leyenda
    legend.text = element_text(size = 13),

    # POsición de la leyenda:
    legend.position = "bottom"
  ) +
  scale_x_continuous(breaks = seq(-10, 10, by = 2)) +
  geom_text(aes(label = "Tratamiento"), x = 2, y = 0.3,
            size = 4.5,
            color = "navy",
            angle = 0,
            hjust = 0.5,
            vjust = -0.5) +
  labs(color = "Agente libre")
```

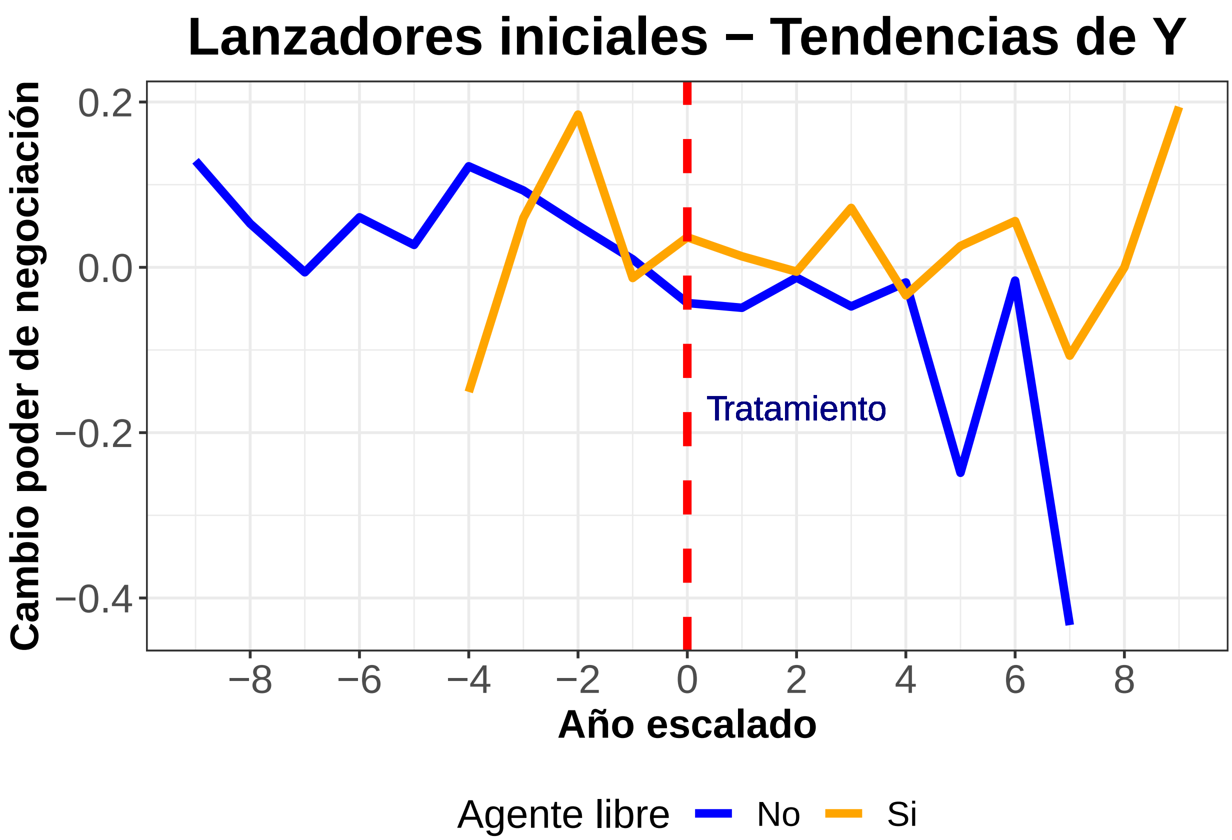



```
# Save the plot as a PDF file
ggsave("did_model_plot_hitter_y.pdf")
```

```
Saving 6.5 x 4.5 in image
```

```
# Create a data frame with outcome variable, treatment indicator, and time variable
parallel_data <- data.frame(Y_Sueldo_regular_norm_t = starting_data_did$Y_Sueldo_regular_norm_t,
                            Tratamiento = starting_data_did$Tratamiento,
                            Anio_did = starting_data_did$Anio_did)

# Calculate mean outcome for treatment and control groups at each time period
parallel_means <- aggregate(Y_Sueldo_regular_norm_t ~ Tratamiento + Anio_did,
                            data = parallel_data,
                            FUN = mean)

# Create plot
ggplot(data = parallel_means,
       aes(x = Anio_did, y = Y_Sueldo_regular_norm_t, color = Tratamiento)) +
  geom_line(size = 1.5) +
  ggtitle("Lanzadores iniciales - Tendencias de Y") +
  xlab("Año escalado") +
  ylab('Cambio poder de negociación') +
  scale_color_manual(values = c("blue", "orange")) +
  theme_bw() +
  theme(plot.title = element_text(hjust = 0.5)) +
  geom_vline(xintercept = 0,
```

```
           linetype = "dashed",
           color = "red",
           size = 1.5) +
  theme(
    #Título de los ejes:
    axis.title.x = element_text(color = "Black",
                                size = 15,
                                face = "bold"),
    axis.title.y = element_text(color="Black",
                                size = 15,
                                face = "bold"),

    #Texto de los ejes:
    axis.text.x = element_text(size = 15),
    axis.text.y = element_text(size = 15),

    #T?tulo del gr?fico:
    plot.title = element_text(color = "Black",
                              size = 20,
                              hjust = 0.5,
                              face = "bold"),

    #T?tulo de la Leyenda:
    legend.title = element_text(size = 15),

    #Texto de la Leyenda
    legend.text = element_text(size = 13),

    # Posición de la leyenda:
    legend.position = "bottom"
  ) +
  scale_x_continuous(breaks = seq(-10, 10, by = 2)) +
  geom_text(aes(label = "Tratamiento"), x = 2, y = -0.2,
          size = 4.5,
          color = "navy",
          angle = 0,
          hjust = 0.5,
          vjust = -0.5) +
  labs(color = "Agente libre")
```




```r
# Save the plot as a PDF file
ggsave("did_model_plot_starting_y.pdf")
```

```
Saving 6.5 x 4.5 in image
```

Repitamos lo mismo para los salarios

```r
# Convert panel_data to a plm data object
plm_data <- pdata.frame(hitter_data_did,
                        index = c("Jugador","Anio_ref"))

# Specify the formula using as.formula
formula <- as.formula("Sueldo_regular_norm_t ~ treatment * factor(Anio_did >= 0) + Anios_de_contrato_t +

# Group standard errors:
hitter_did_results <- coeftest(hitter_did_model,
                               vcov = vcovHC(hitter_did_model,
                                             type = "HC1",
                                             cluster = "group"))

# Print the third block of results
stargazer(hitter_did_results,
          no.space = TRUE,
          type = "text",
          title = "Bateadores regulares: Salario regular DID",
          covariate.labels = c("Tratamiento", "Agent_period$_{t}$",
```

```
                                "Anios_contrato$_{t}$",
                                "Edad$_{t}$", "Equipo$_{t}$",
                                "ATE"))
```

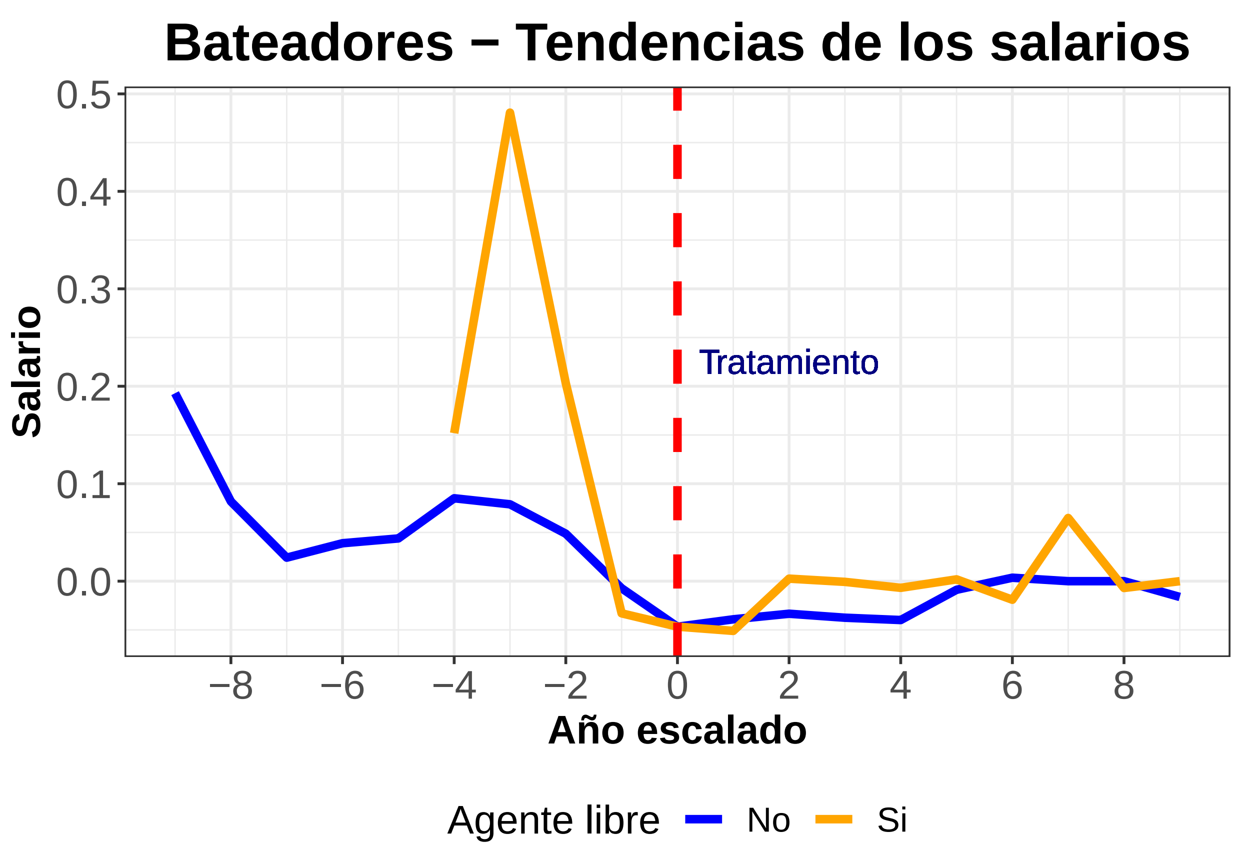
```
Bateadores regulares: Salario regular DID
=======================================
               Dependent variable:
            ---------------------------

---------------------------------------
Tratamiento           0.058*
                      (0.032)
Agentt               -0.064***
                      (0.014)
Aniost                 0.003
                      (0.004)
Edadt                -0.010***
                      (0.002)
Equipot               0.0005
                      (0.001)
ATE                   -0.018
                      (0.034)
=======================================
=======================================
Note:       *p<0.1; **p<0.05; ***p<0.01
```

```
# Convert panel_data to a plm data object
plm_data <- pdata.frame(starting_data_did,
                        index = c("Jugador","Anio_ref"))

# Specify the formula using as.formula
formula <- as.formula("Sueldo_regular_norm_t ~ treatment * factor(Anio_did >= 0) + Anios_de_contrato_t +

# Estimate DID model with multiple periods
starting_did_model <- plm(formula,
                           data = plm_data,
                           model = "within")

# Group standard errors:
starting_did_results <- coeftest(starting_did_model,
                                 vcov = vcovHC(starting_did_model,
                                               type = "HC1",
                                               cluster = "group"))

# Print the third block of results
stargazer(starting_did_results,
          no.space = TRUE,
          type = "text",
          title = "Lanzadores Iniciales: w DID",
          covariate.labels = c("Tratamiento", "Agent_period$_{t}$",
                               "Anios_contrato$_{t}$",
                               "Edad$_{t}$", "Equipo$_{t}$",
                               "ATE"))
```

```
Lanzadores Iniciales: w DID
=======================================
                Dependent variable:
            ---------------------------

---------------------------------------
Tratamiento            0.048
                      (0.035)
Agentt                 0.021
                      (0.019)
Aniost               0.065***
                      (0.007)
Edadt                0.023***
                      (0.004)
Equipot               -0.0004
                      (0.001)
ATE                   -0.063*
                      (0.038)
=======================================
=======================================
Note:       *p<0.1; **p<0.05; ***p<0.01
```

```
# Create a data frame with outcome variable, treatment indicator, and time variable
parallel_data <- data.frame(Sueldo_regular_norm_t = hitter_data_did$Y_Sueldo_regular_norm_t,
                            Tratamiento = hitter_data_did$Tratamiento,
                            Anio_did = hitter_data_did$Anio_did)

# Calculate mean outcome for treatment and control groups at each time period
parallel_means <- aggregate(Sueldo_regular_norm_t ~ Tratamiento + Anio_did, data = parallel_data, FUN =

# Create plot
ggplot(data = parallel_means,
       aes(x = Anio_did, y = Sueldo_regular_norm_t, color = Tratamiento)) +
  geom_line(size = 1.5) +
  ggtitle("Bateadores - Tendencias de los salarios") +
  xlab("Año escalado") +
  ylab('Salario') +
  scale_color_manual(values = c("blue", "orange")) +
  theme_bw() +
  theme(plot.title = element_text(hjust = 0.5)) +
  geom_vline(xintercept = 0,
             linetype = "dashed",
             color = "red",
             size = 1.5) +
  theme(
    #Título de los ejes:
    axis.title.x = element_text(color = "Black",
                                size = 15,
                                face = "bold"),
    axis.title.y = element_text(color="Black",
                                size = 15,
                                face = "bold"),

    #Texto de los ejes:
```

```
  axis.text.x = element_text(size = 15),
  axis.text.y = element_text(size = 15),

  #T?tulo del gr?fico:
  plot.title = element_text(color = "Black",
                            size = 20,
                            hjust = 0.5,
                            face = "bold"),

  #T?tulo de la Leyenda:
  legend.title = element_text(size = 15),

  #Texto de la Leyenda
  legend.text = element_text(size = 13),

  # POsición de la leyenda:
  legend.position = "bottom"
) +
scale_x_continuous(breaks = seq(-10, 10, by = 2)) +
geom_text(aes(label = "Tratamiento"), x = 2, y = 0.2,
          size = 4.5,
          color = "navy",
          angle = 0,
          hjust = 0.5,
          vjust = -0.5) +
labs(color = "Agente libre")
```

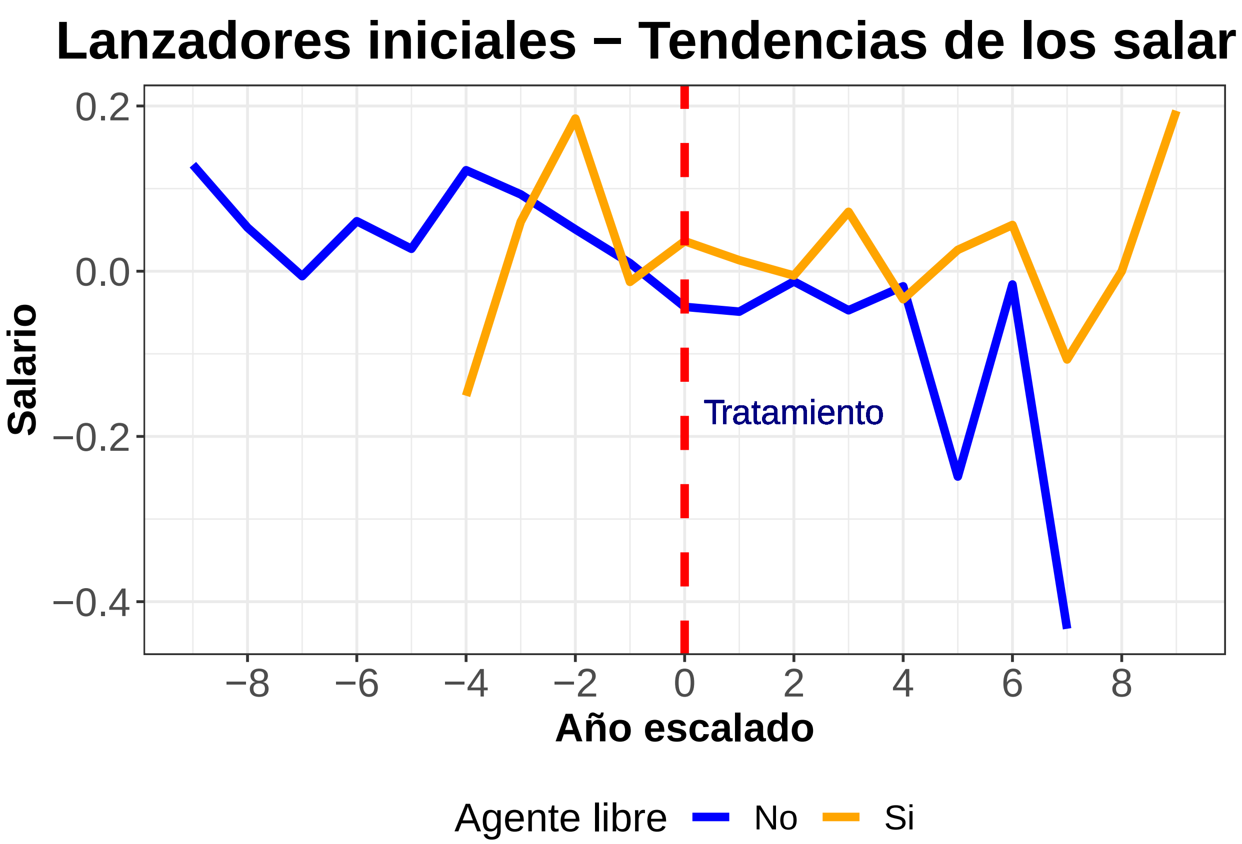


```r
# Save the plot as a PDF file
ggsave("did_model_plot_hitter_w.pdf")
```

```
Saving 6.5 x 4.5 in image
```

```r
# Create a data frame with outcome variable, treatment indicator, and time variable
parallel_data <- data.frame(Sueldo_regular_norm_t = starting_data_did$Y_Sueldo_regular_norm_t,
                            Tratamiento = starting_data_did$Tratamiento,
                            Anio_did = starting_data_did$Anio_did)

# Calculate mean outcome for treatment and control groups at each time period
parallel_means <- aggregate(Sueldo_regular_norm_t ~ Tratamiento + Anio_did, data = parallel_data,
                            FUN = mean)

# Create plot
ggplot(data = parallel_means,
       aes(x = Anio_did, y = Sueldo_regular_norm_t, color = Tratamiento)) +
  geom_line(size = 1.5) +
  ggtitle("Lanzadores iniciales - Tendencias de los salarios") +
  xlab("Año escalado") +
  ylab('Salario') +
  scale_color_manual(values = c("blue", "orange")) +
  theme_bw() +
  theme(plot.title = element_text(hjust = 0.5)) +
  geom_vline(xintercept = 0,
             linetype = "dashed",
             color = "red",
             size = 1.5) +
  theme(
    #Título de los ejes:
    axis.title.x = element_text(color = "Black",
                                size = 15,
                                face = "bold"),
    axis.title.y = element_text(color="Black",
                                size = 15,
                                face = "bold"),

    #Texto de los ejes:
    axis.text.x = element_text(size = 15),
    axis.text.y = element_text(size = 15),

    #T?tulo del gr?fico:
    plot.title = element_text(color = "Black",
                              size = 20,
                              hjust = 0.5,
                              face = "bold"),

    #T?tulo de la Leyenda:
    legend.title = element_text(size = 15),

    #Texto de la Leyenda
    legend.text = element_text(size = 13),
```

```
    # POsición de la leyenda:
    legend.position = "bottom"
  ) +
  scale_x_continuous(breaks = seq(-10, 10, by = 2)) +
  geom_text(aes(label = "Tratamiento"), x = 2, y = -0.2,
            size = 4.5,
            color = "navy",
            angle = 0,
            hjust = 0.5,
            vjust = -0.5) +
  labs(color = "Agente libre")
```




```
# Save the plot as a PDF file
ggsave("did_model_plot_starting_w.pdf")
```

```
Saving 6.5 x 4.5 in image
```