# DiD TWFE-Q

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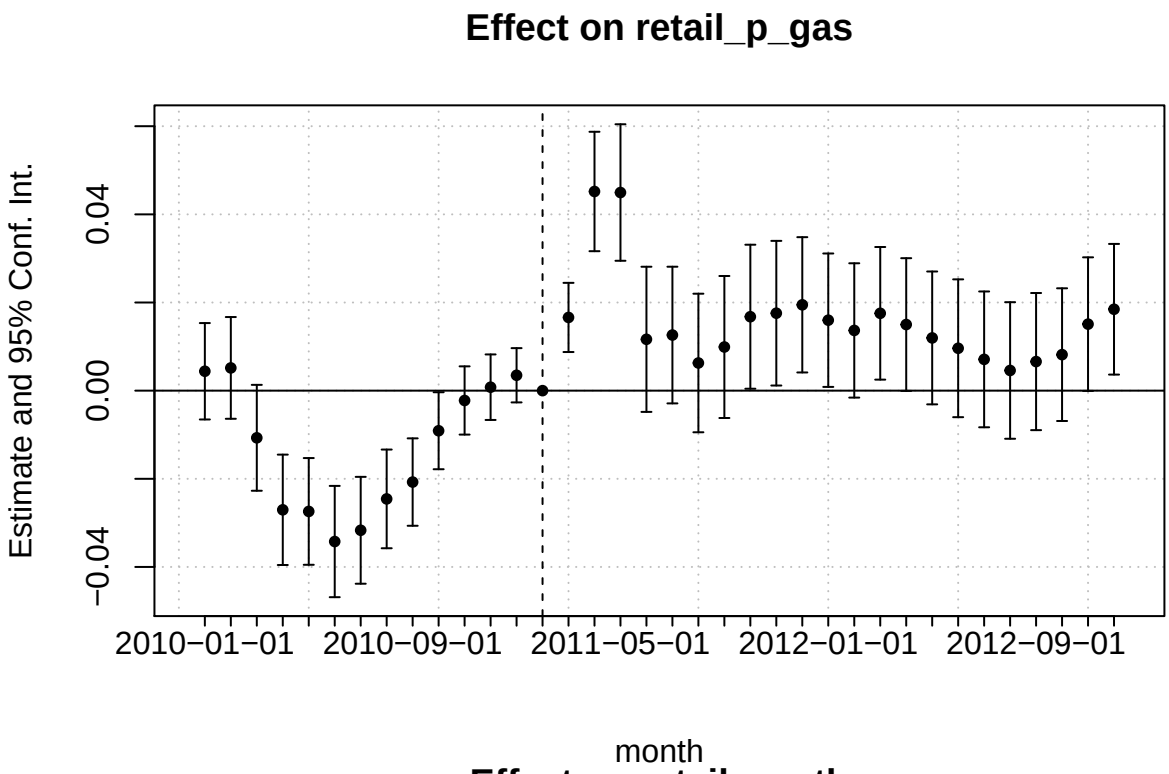
## Diff-in-Diff two way fixed effects (TWFE)

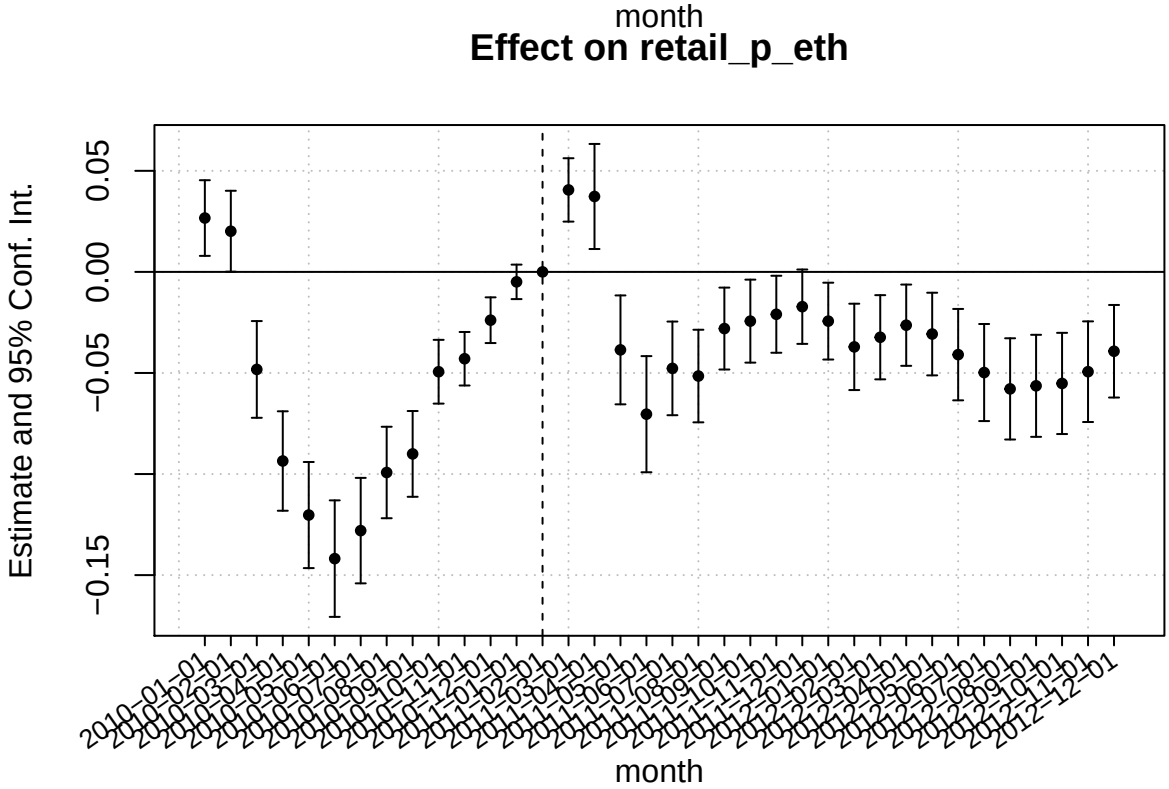
$$Y_{it} = \boldsymbol{\beta}_t'(Treatment_{it} * \boldsymbol{Month}_t) + \alpha X_{it} + \gamma_i^{Mun} + \gamma_t^{Qt} + \varepsilon_{it} \tag{1}$$

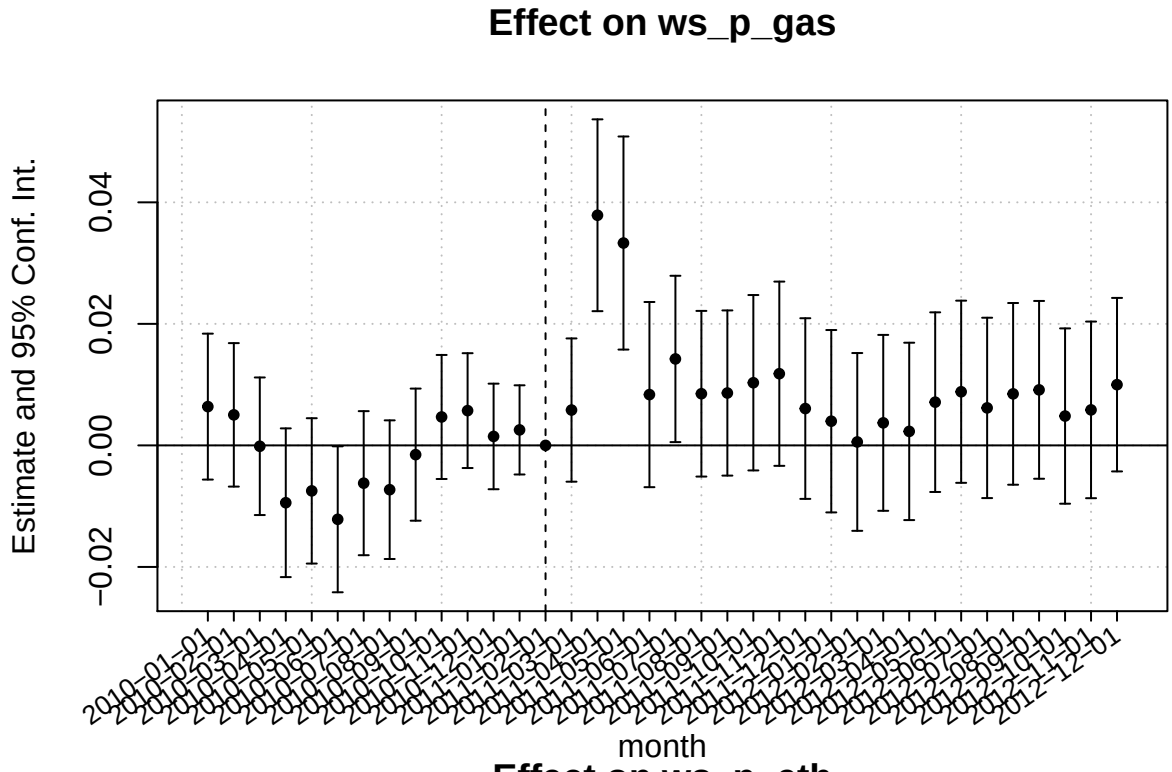
where $i$ stands for municipality and $t$ for month. $Y_{it}$ is one of the outcome variables of interest. $Treatment_{it}$ is a dummy variable equal to one if the municipality is in the treatment group and zero if it is in the control group. $Month_t$ is a vector of the month-year period dummy variables (96 month-year periods). $\gamma_i^{Mun}$ and $\gamma_t^{Qt}$ are municipality and month-year fixed effects, respectively. Finally, $X_{it}$ is a vector of control variables.

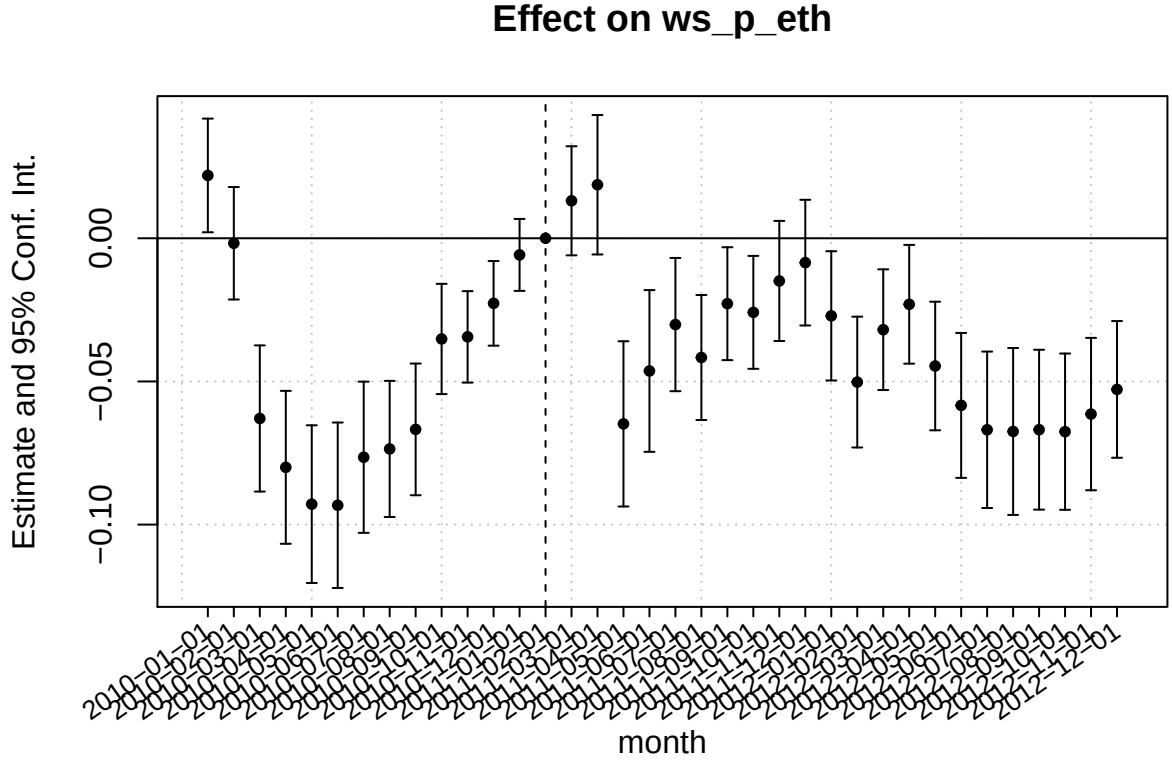
The graphs below show only the interaction between the *Month* and the *Treatment* variables.

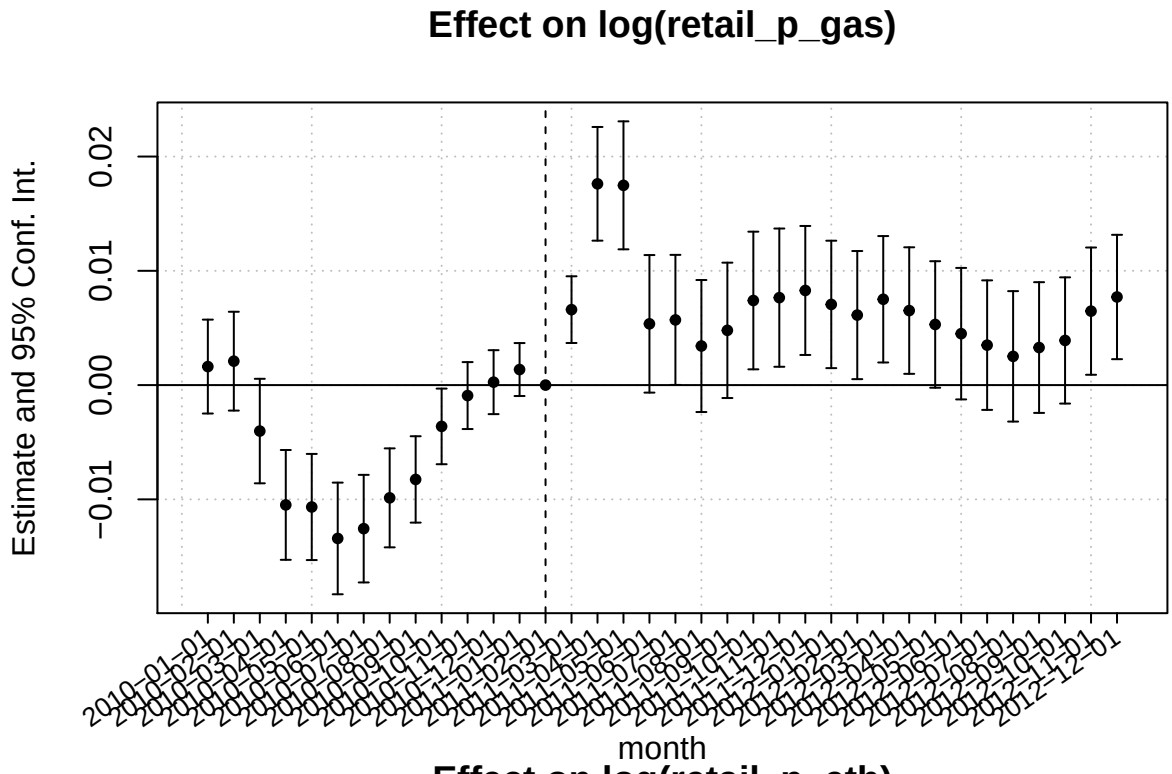
## Both as treatment, Just One and None as control

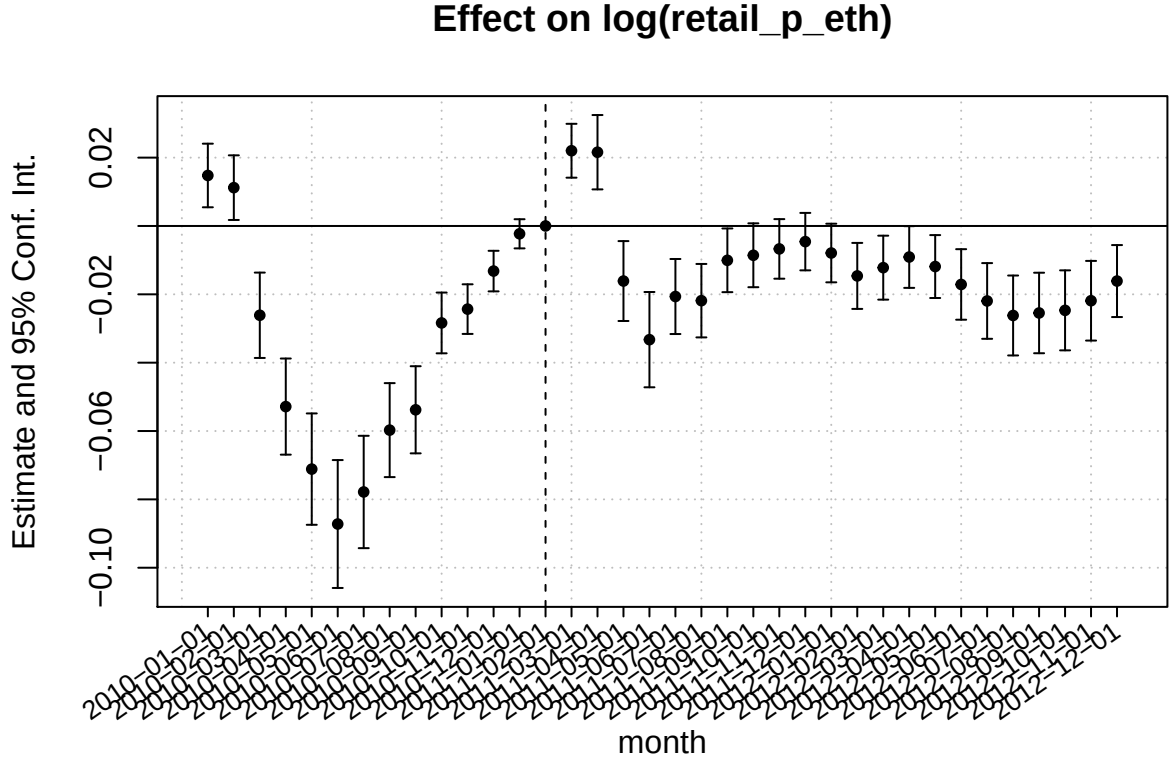


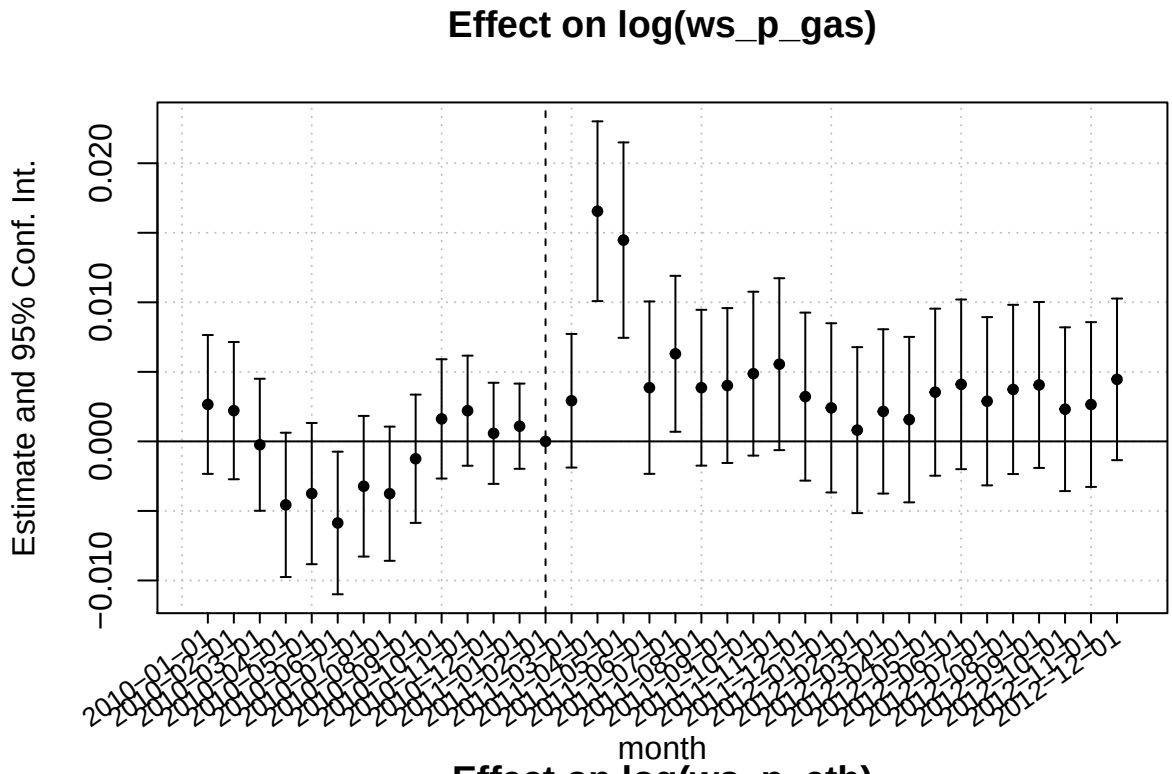



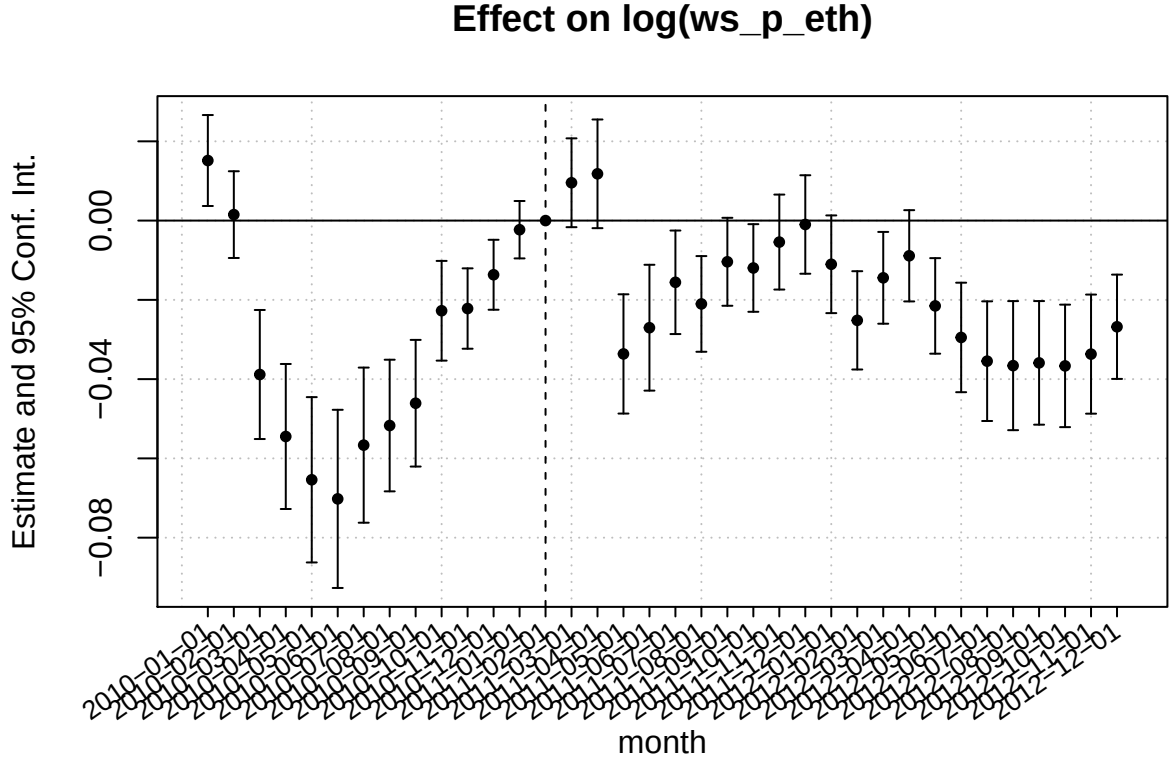

Effect on ws_p_gas
Estimate and 95% Conf. Int.
−0.02
0.00
0.02
0.04
month

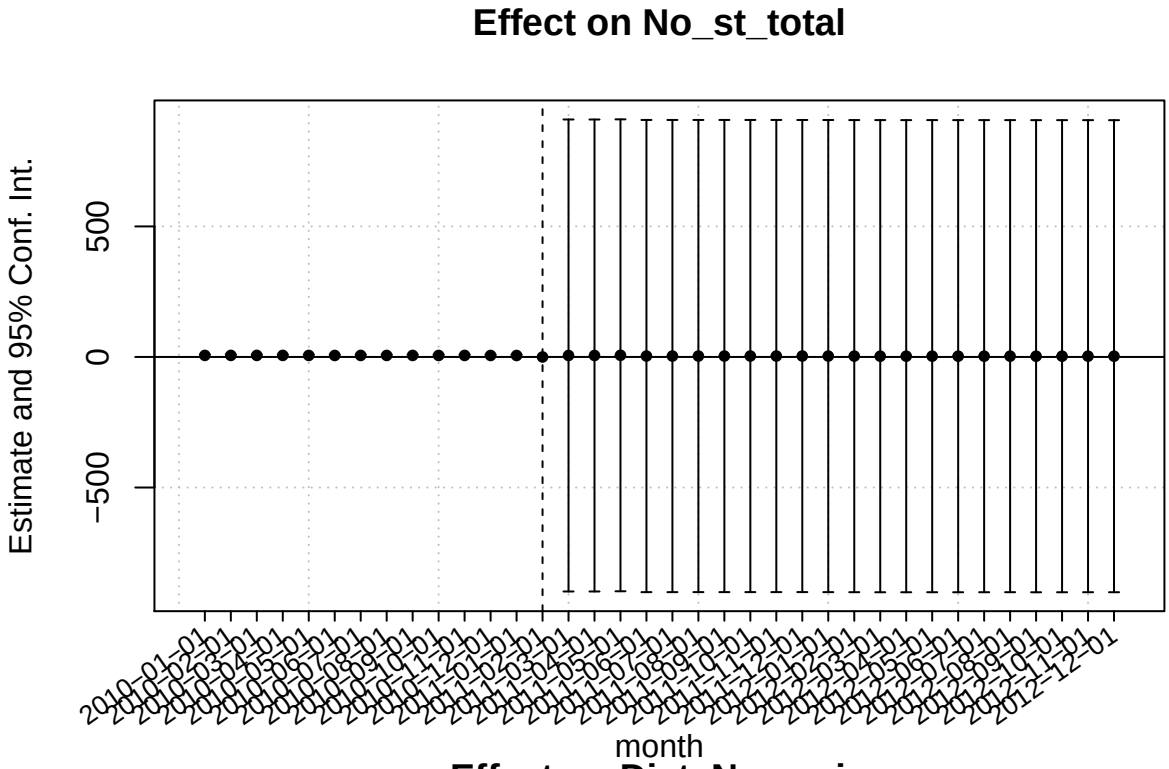

Effect on ws_p_eth
Estimate and 95% Conf. Int.
−0.10
−0.05
0.00
month

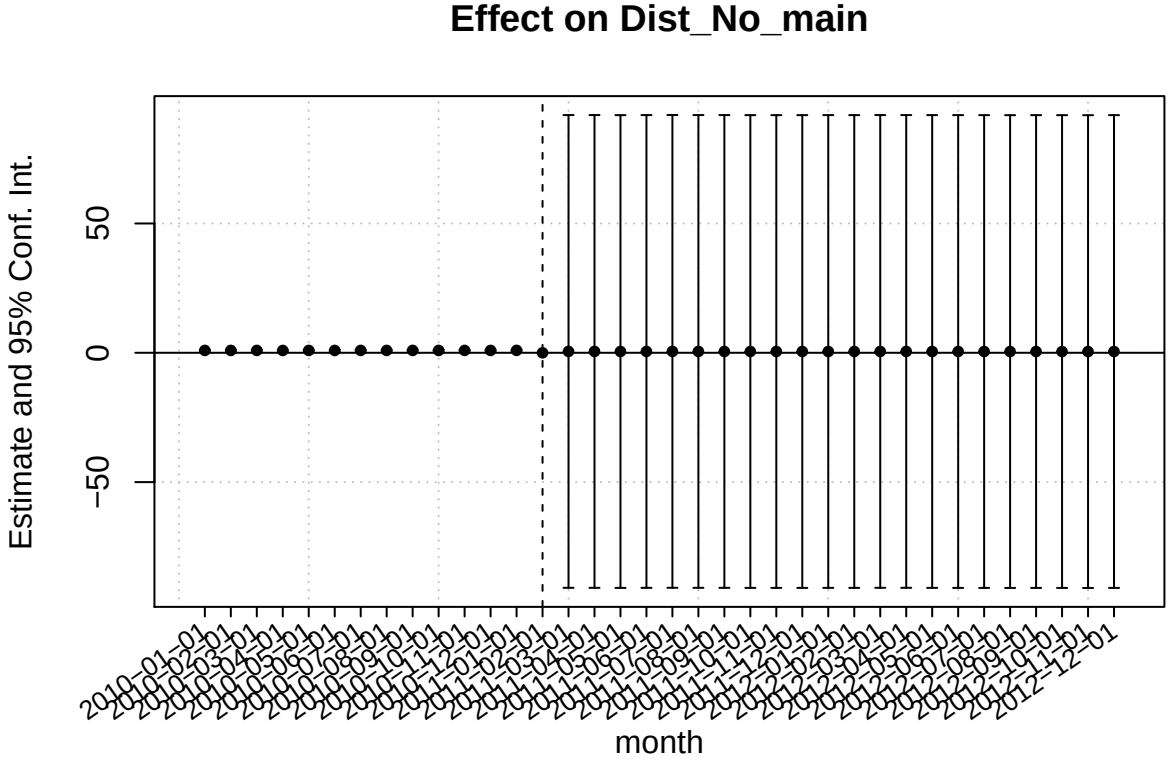

Effect on log(retail_p_gas)
Estimate and 95% Conf. Int.
0.02
0.01
0.00
−0.01
month

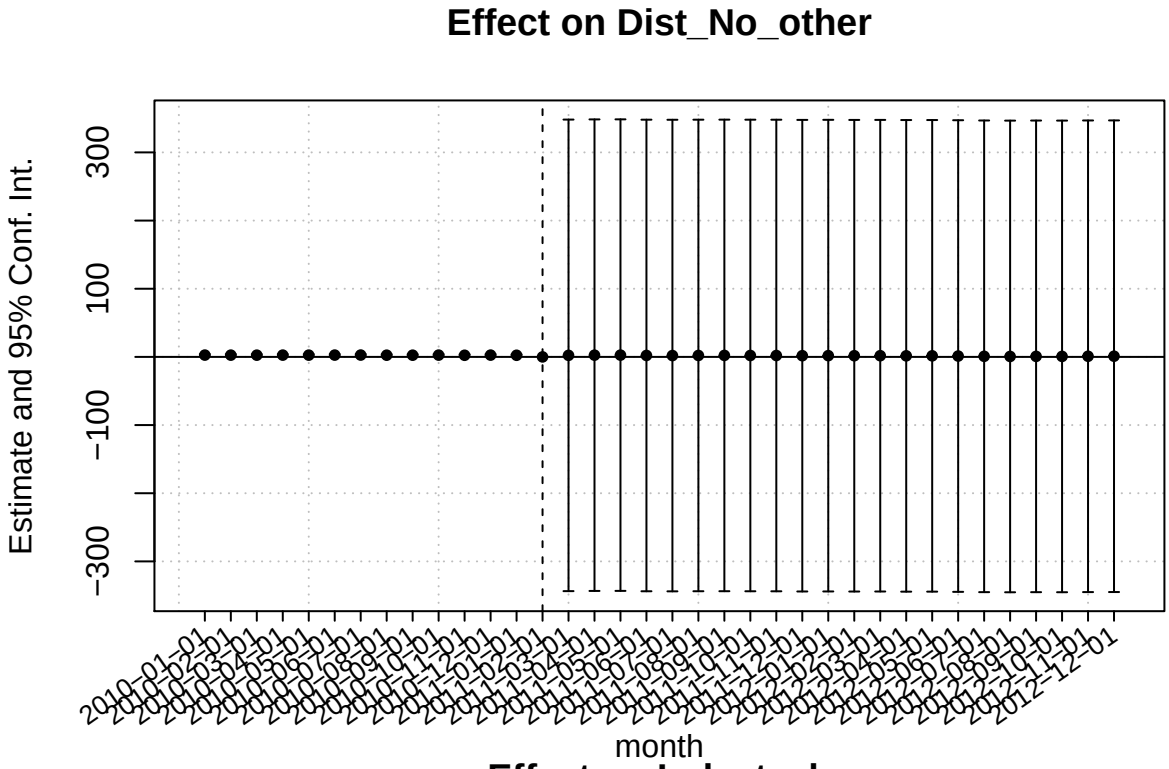

Effect on log(retail_p_eth)
Estimate and 95% Conf. Int.
0.02
−0.02
−0.06
−0.10
month

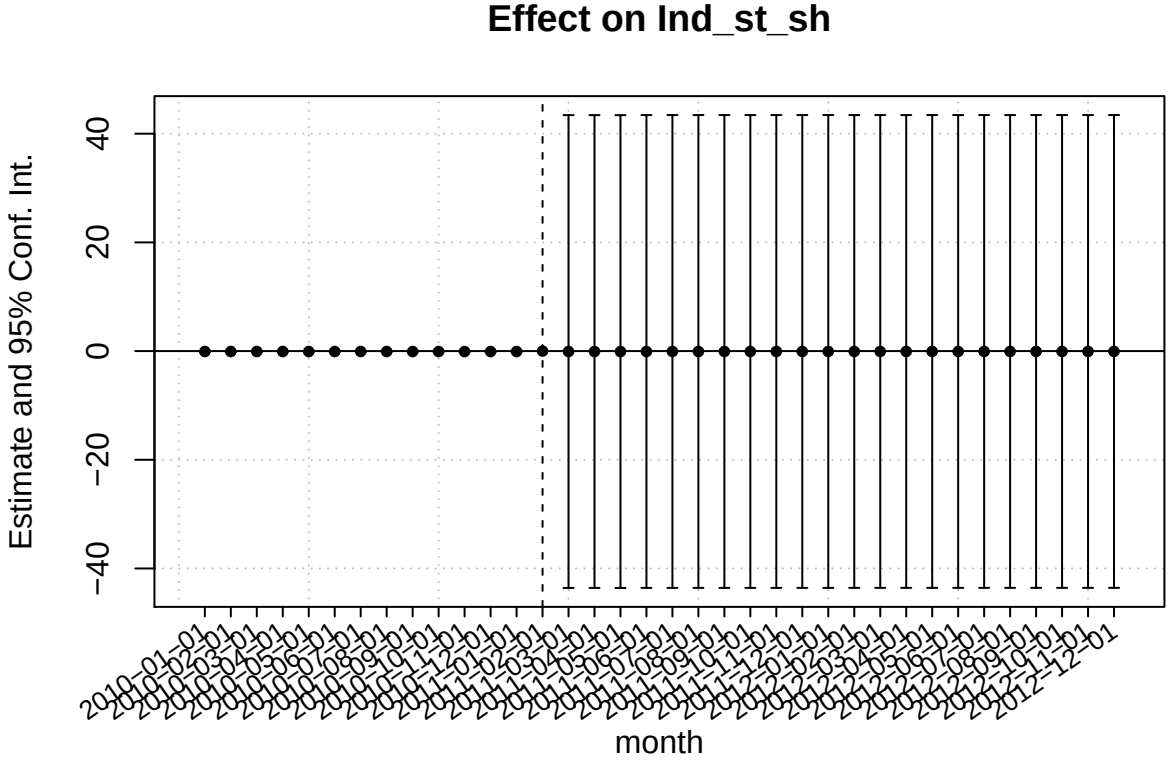

Effect on log(ws_p_gas)
Estimate and 95% Conf. Int.
0.020
0.010
0.000
−0.010
month

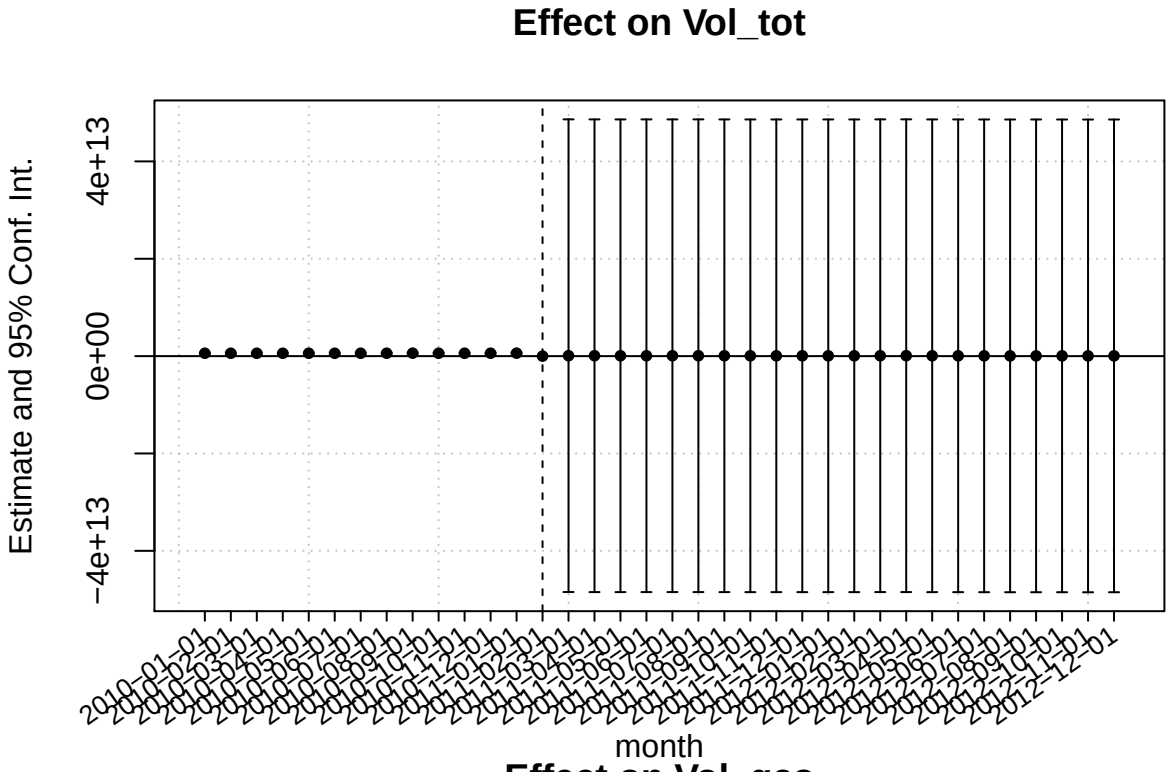

Effect on log(ws_p_eth)
Estimate and 95% Conf. Int.
0.00
−0.04
−0.08
month

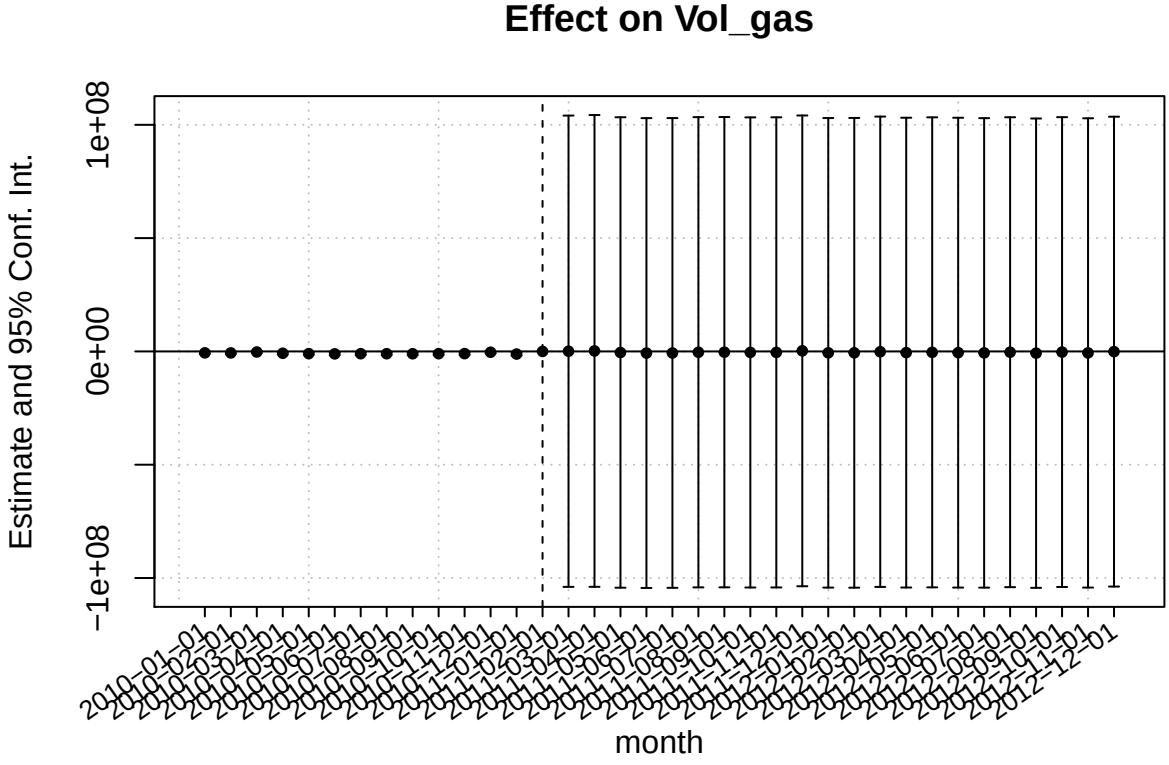

Effect on No_st_total
Estimate and 95% Conf. Int.
500
0
−500
month

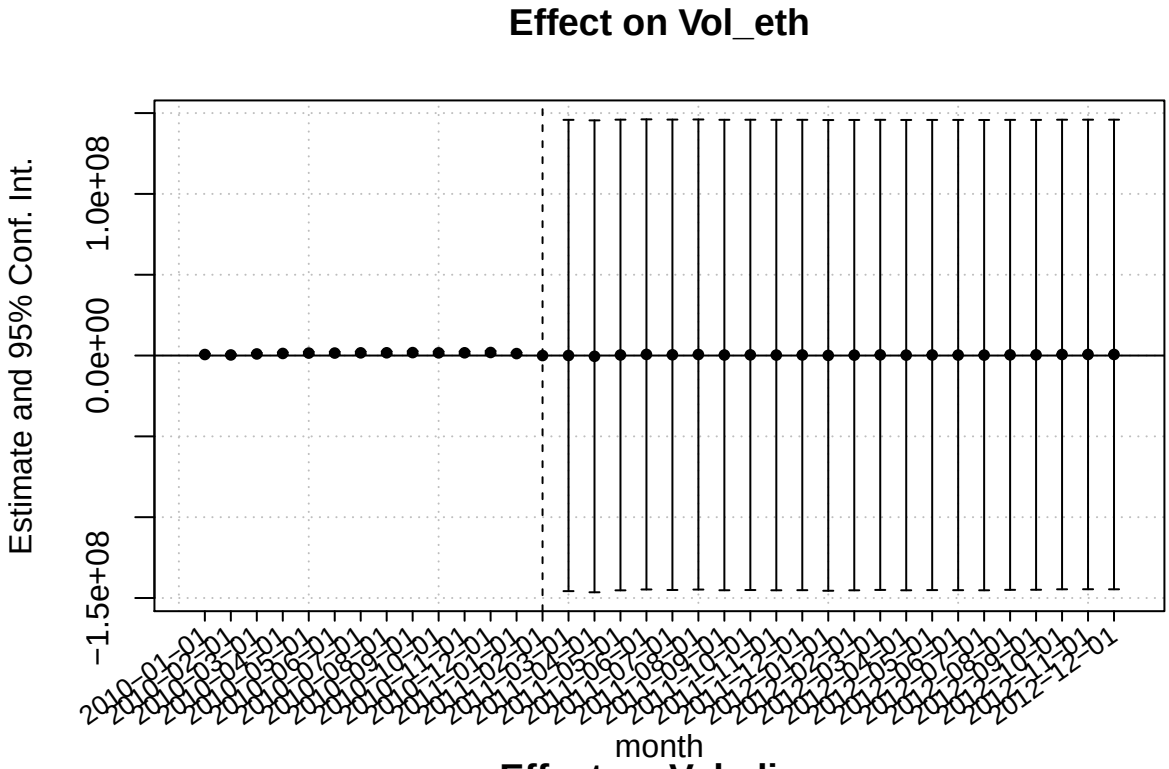

Effect on Dist_No_main
Estimate and 95% Conf. Int.
50
0
−50
month

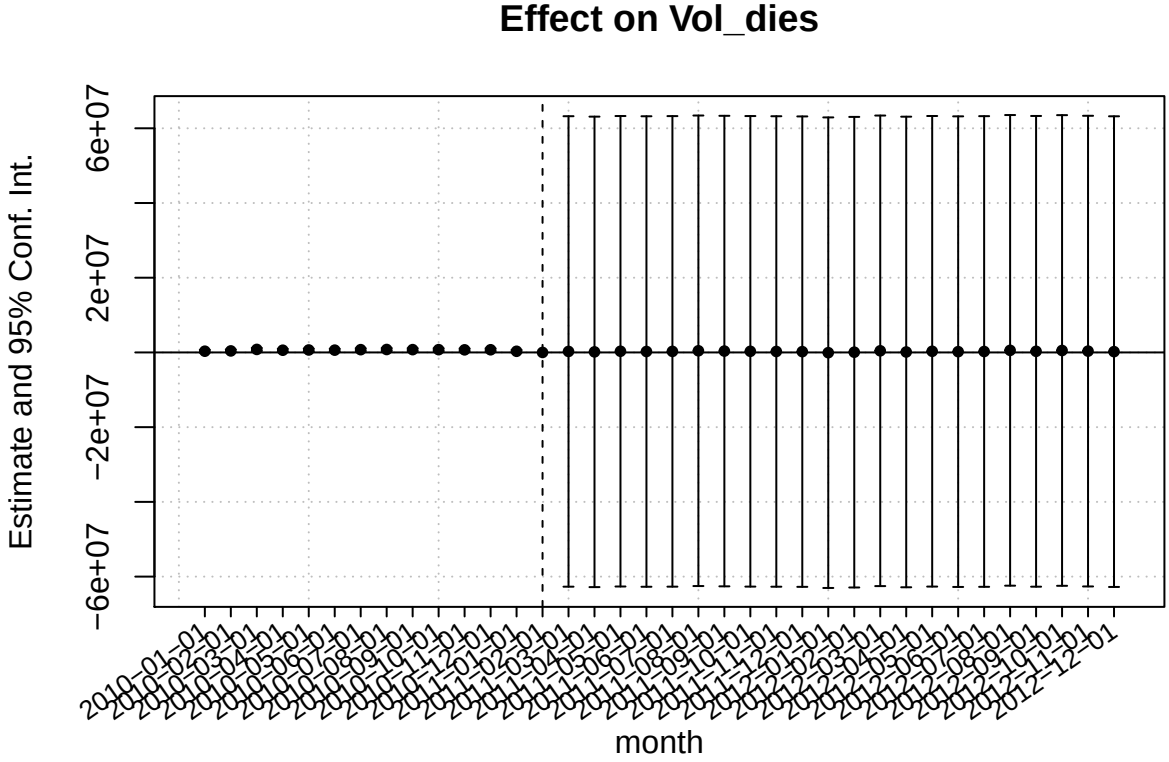

Effect on Dist_No_other
Estimate and 95% Conf. Int.
300
100
−100
−300
month

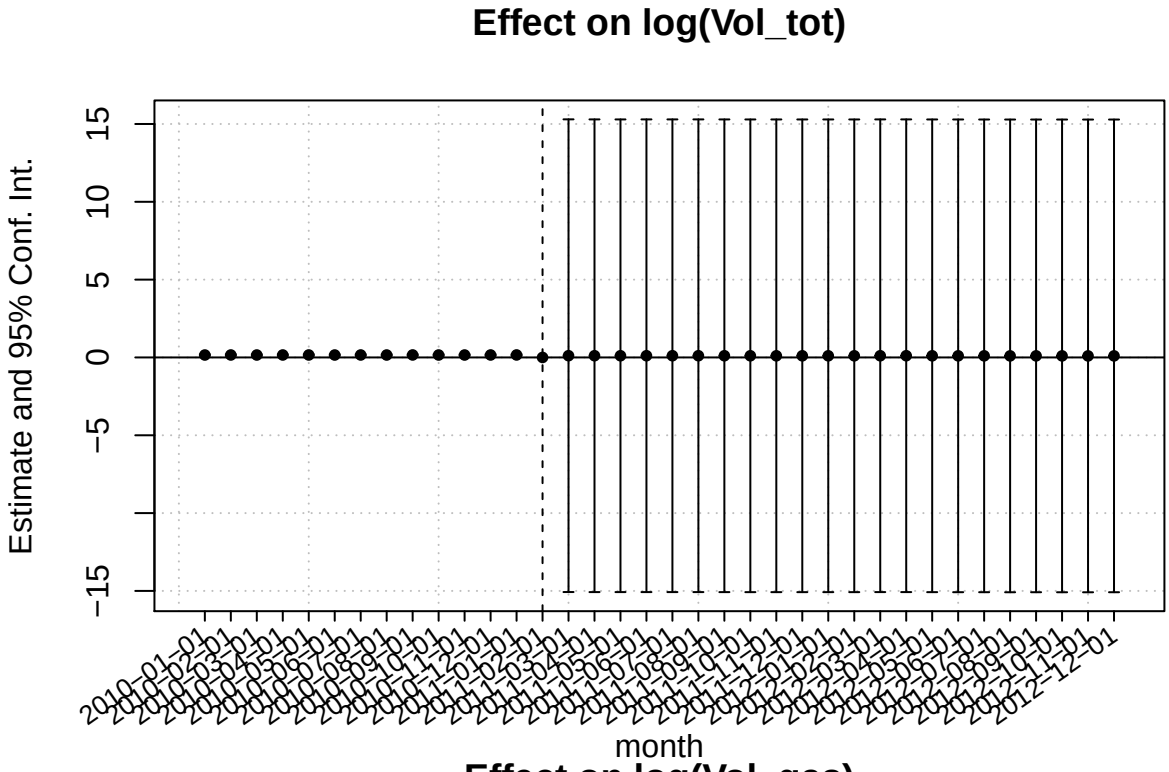

Effect on Ind_st_sh
Estimate and 95% Conf. Int.
40
20
0
−20
−40
month

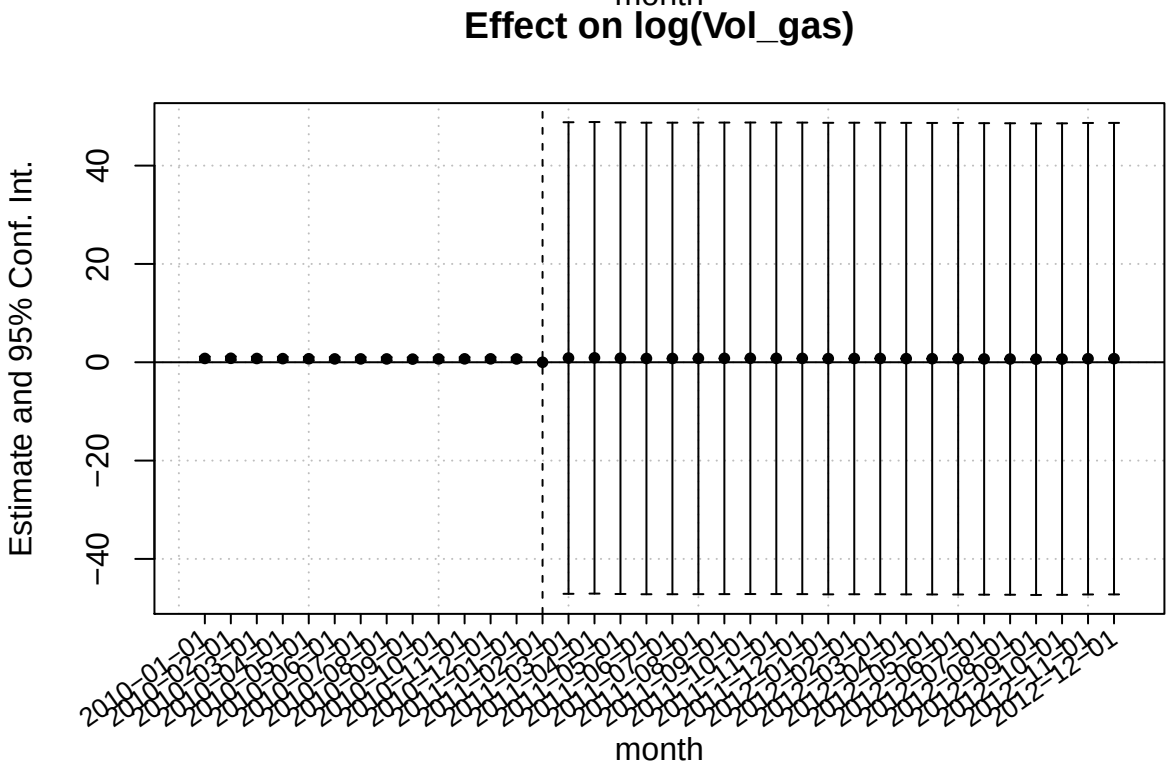

Effect on Vol_tot
Estimate and 95% Conf. Int.
4e+13
0e+00
−4e+13
month

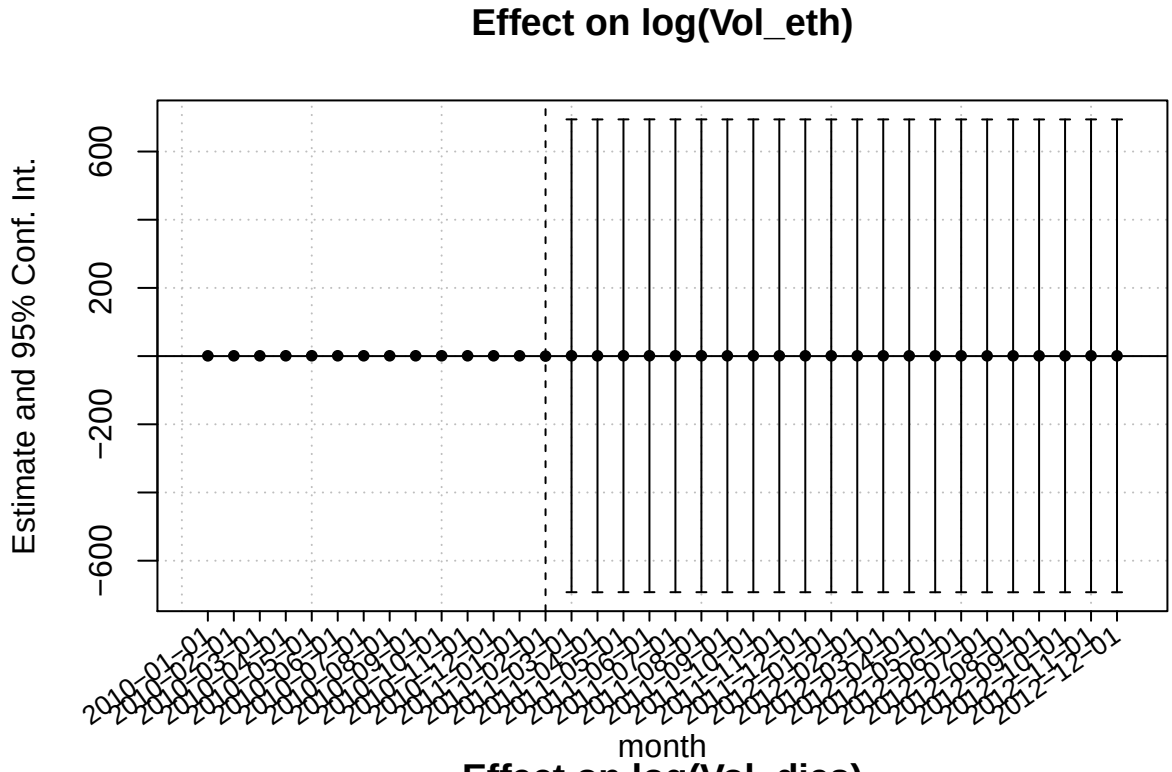

Effect on Vol_gas
Estimate and 95% Conf. Int.
1e+08
0e+00
−1e+08
month

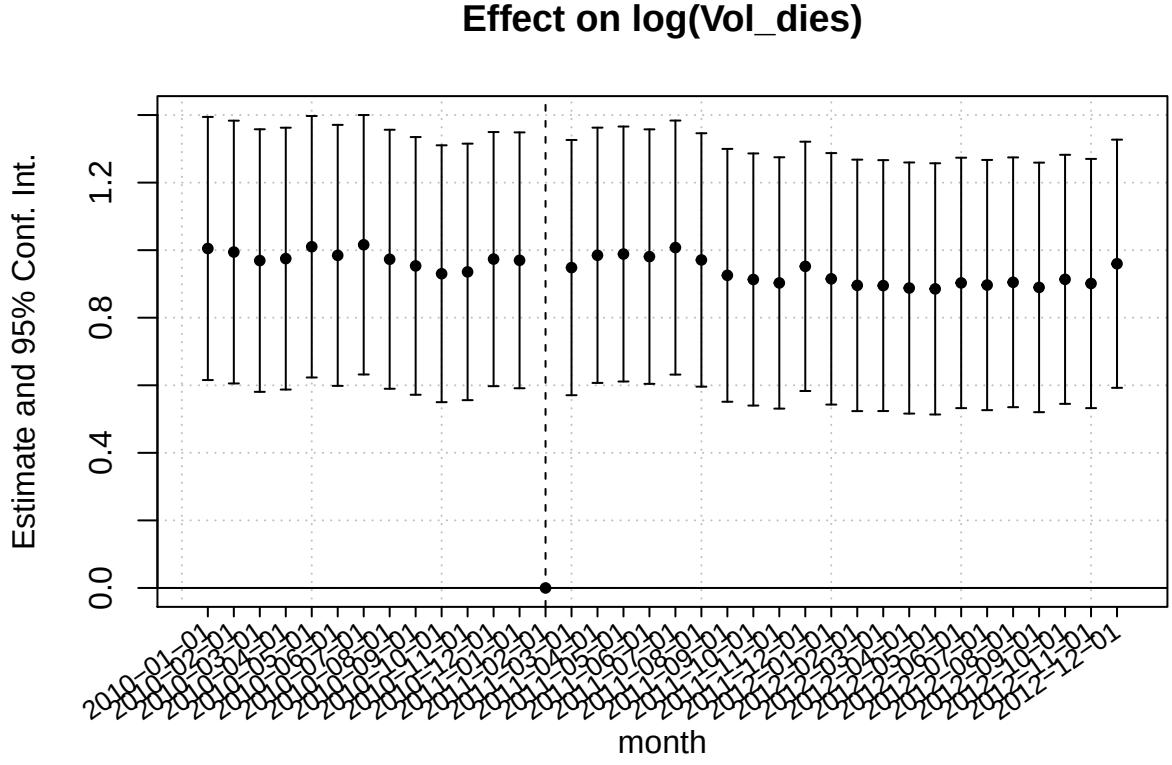

Effect on Vol_eth
Estimate and 95% Conf. Int.
−1.5e+08
0.0e+00
1.0e+08
month

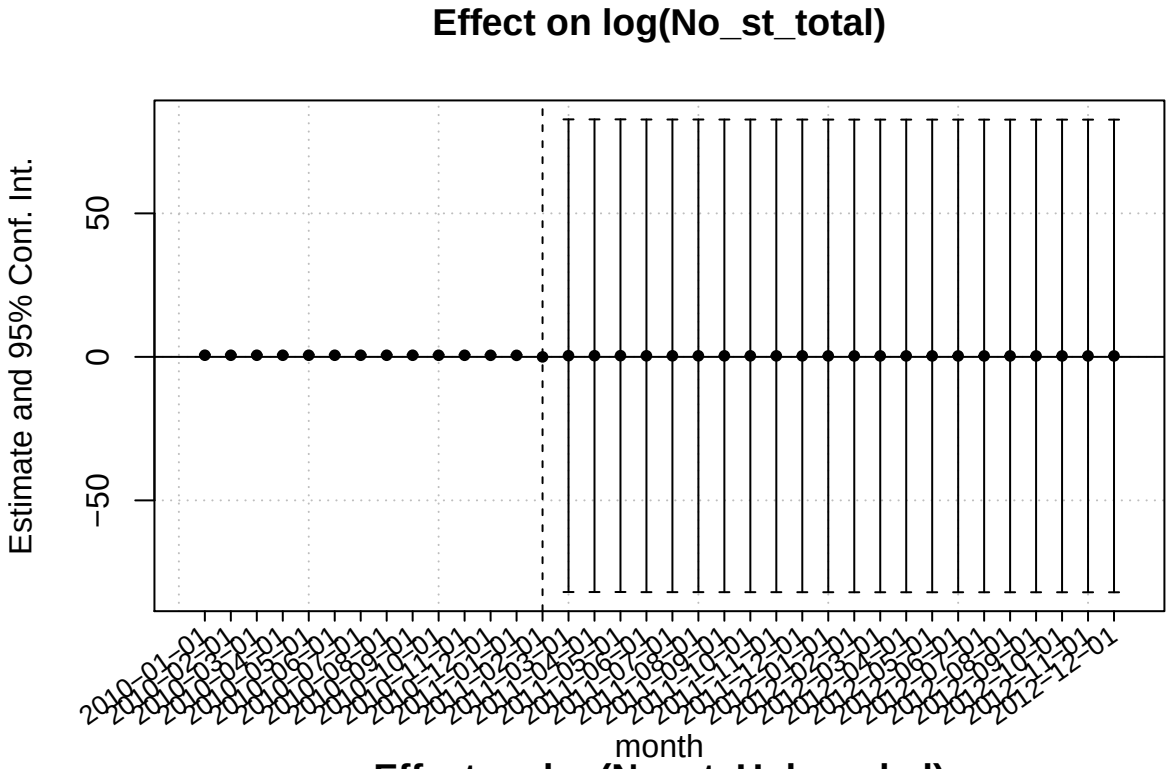

Effect on Vol_dies
Estimate and 95% Conf. Int.
−6e+07
−2e+07
2e+07
6e+07
month

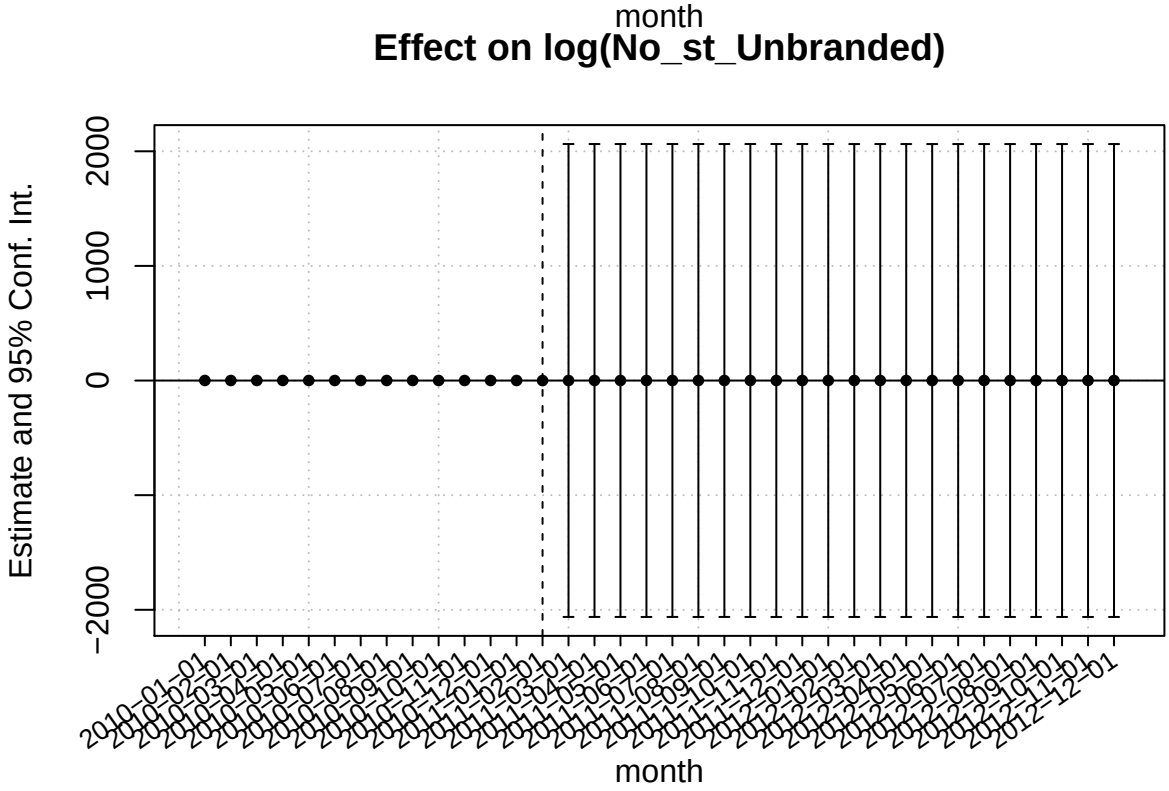

Effect on log(Vol_tot)
Estimate and 95% Conf. Int.
15
10
5
0
−5
−15
month


Effect on log(Vol_gas)
Estimate and 95% Conf. Int.
40
20
0
−20
−40
month

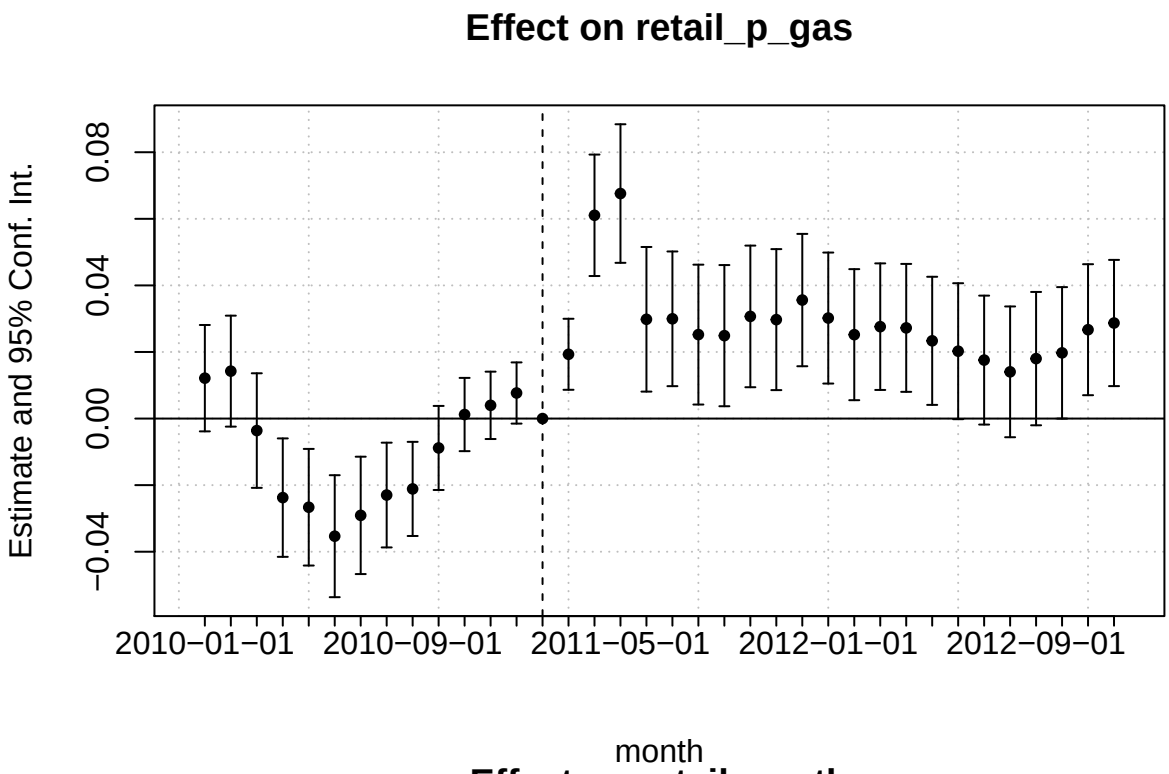

Effect on log(Vol_eth)
Estimate and 95% Conf. Int.
600
200
−200
−600
month

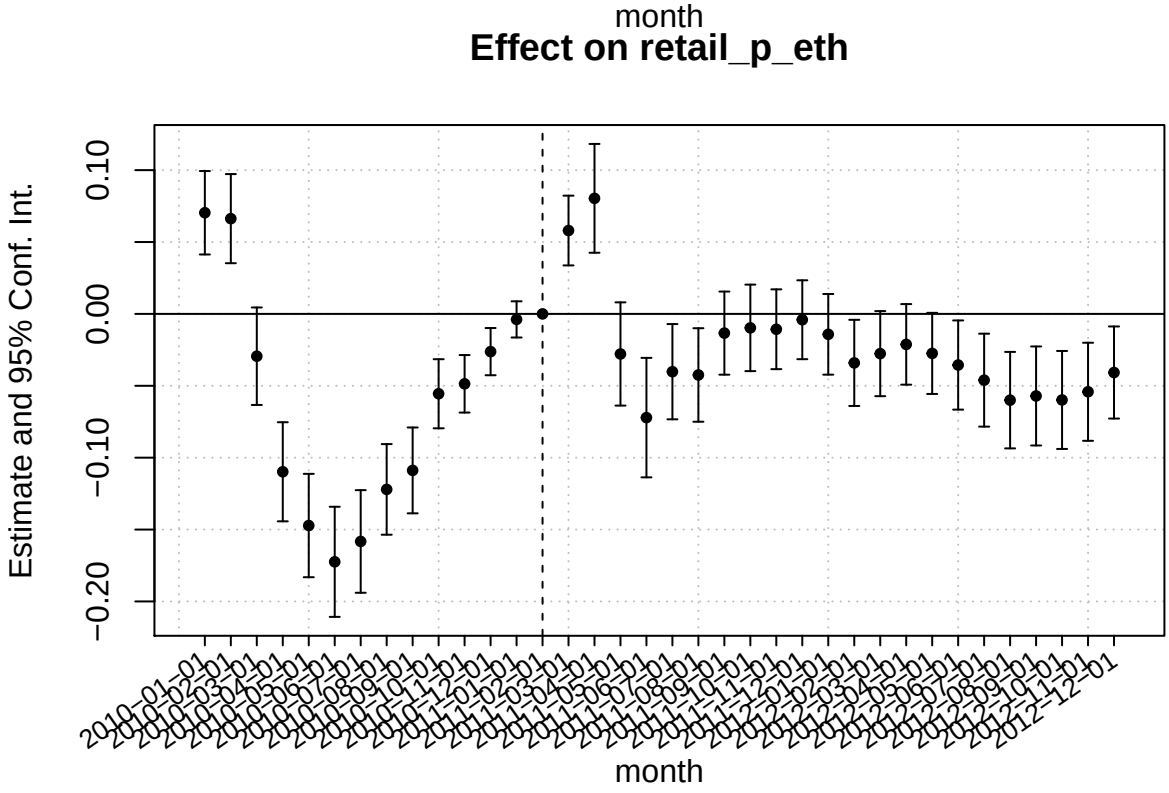

Effect on log(Vol_dies)
Estimate and 95% Conf. Int.
1.2
0.8
0.4
0.0
month

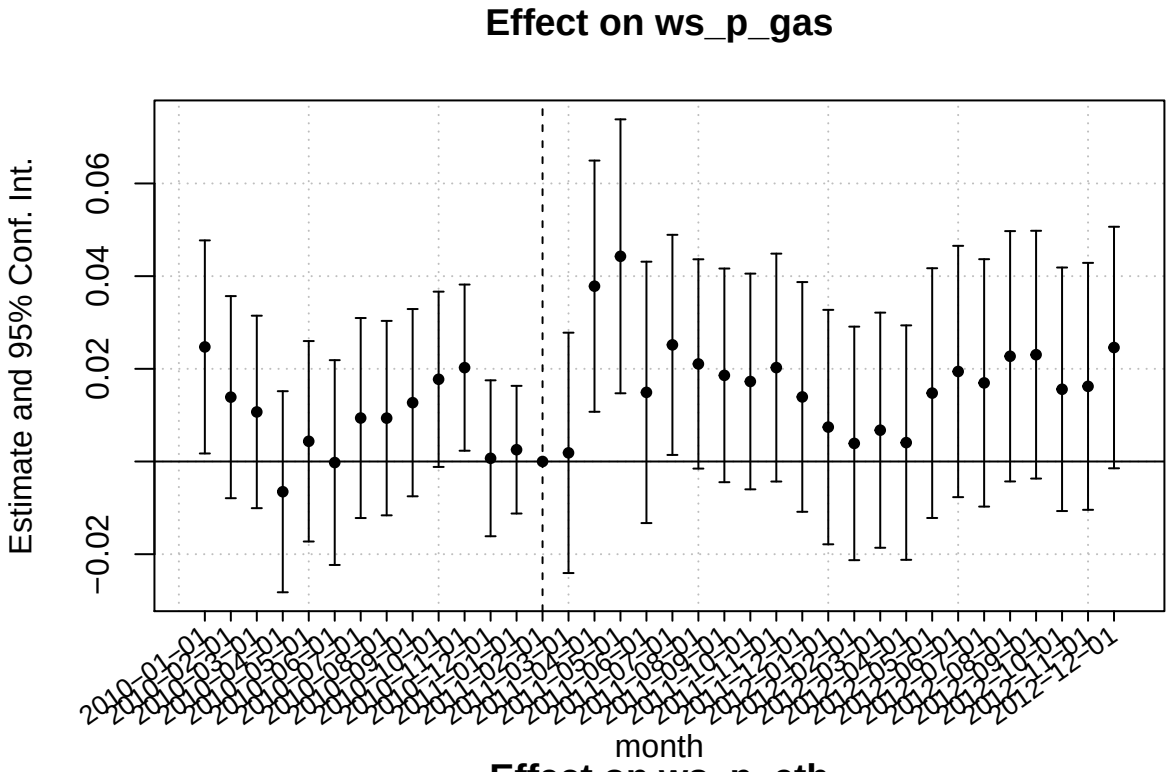

Effect on log(No_st_total)
Estimate and 95% Conf. Int.
50
0
−50
month

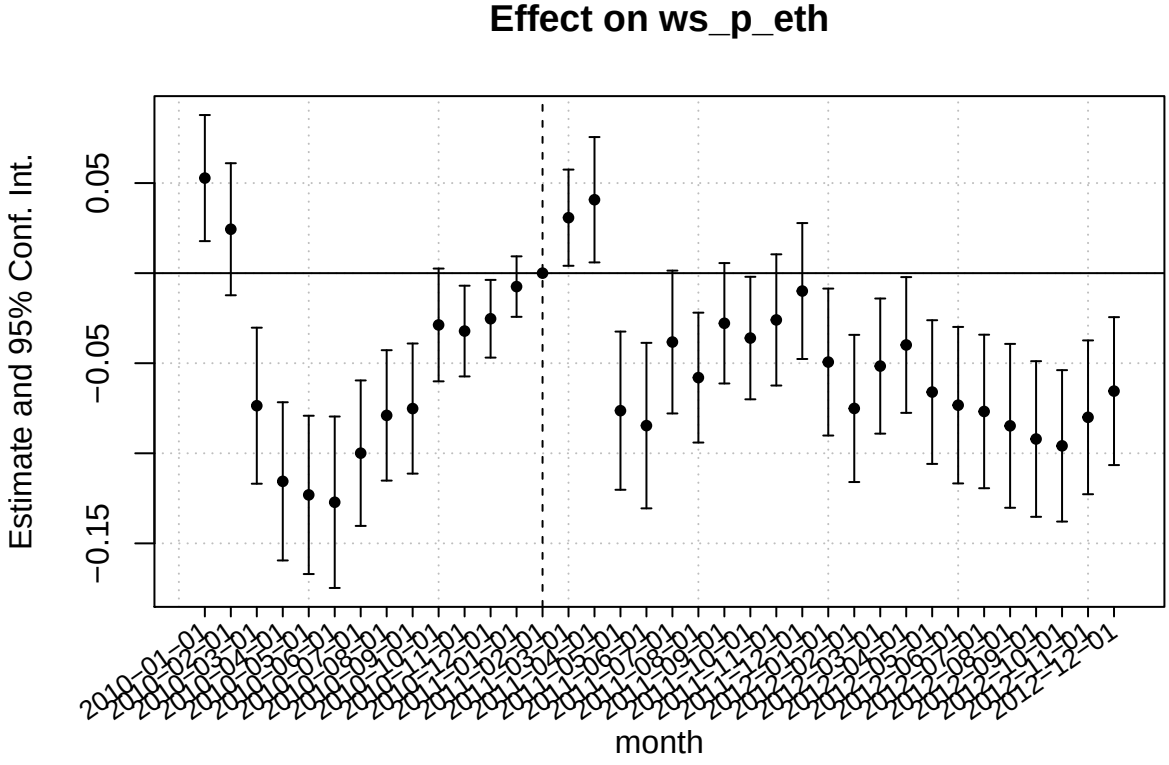

Effect on log(No_st_Unbranded)
Estimate and 95% Conf. Int.
2000
1000
0
−2000
month

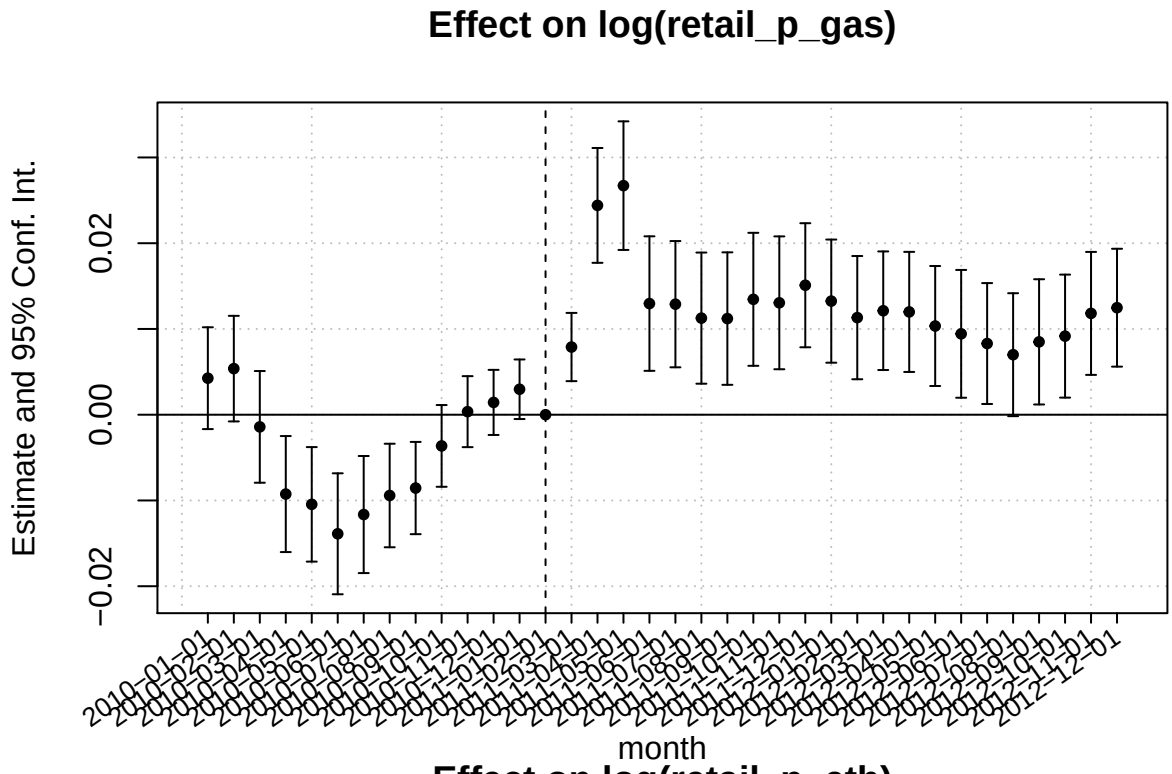
**Both as treatment, None as control**

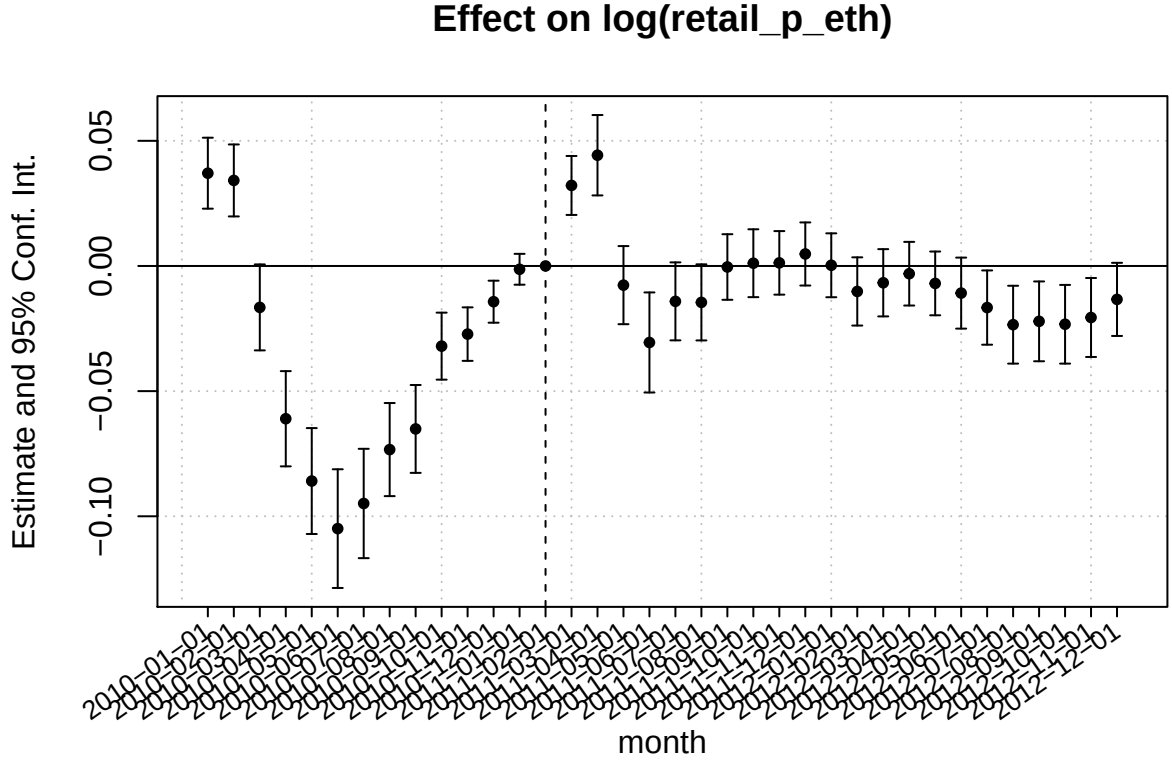


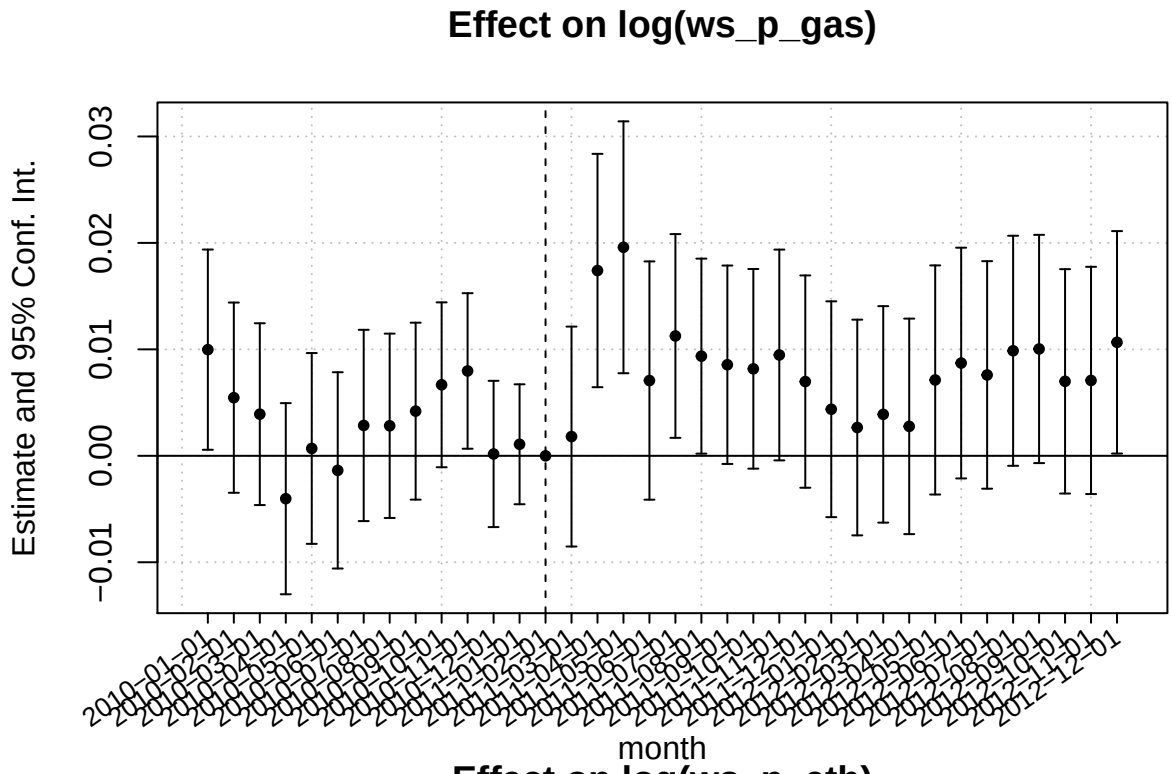



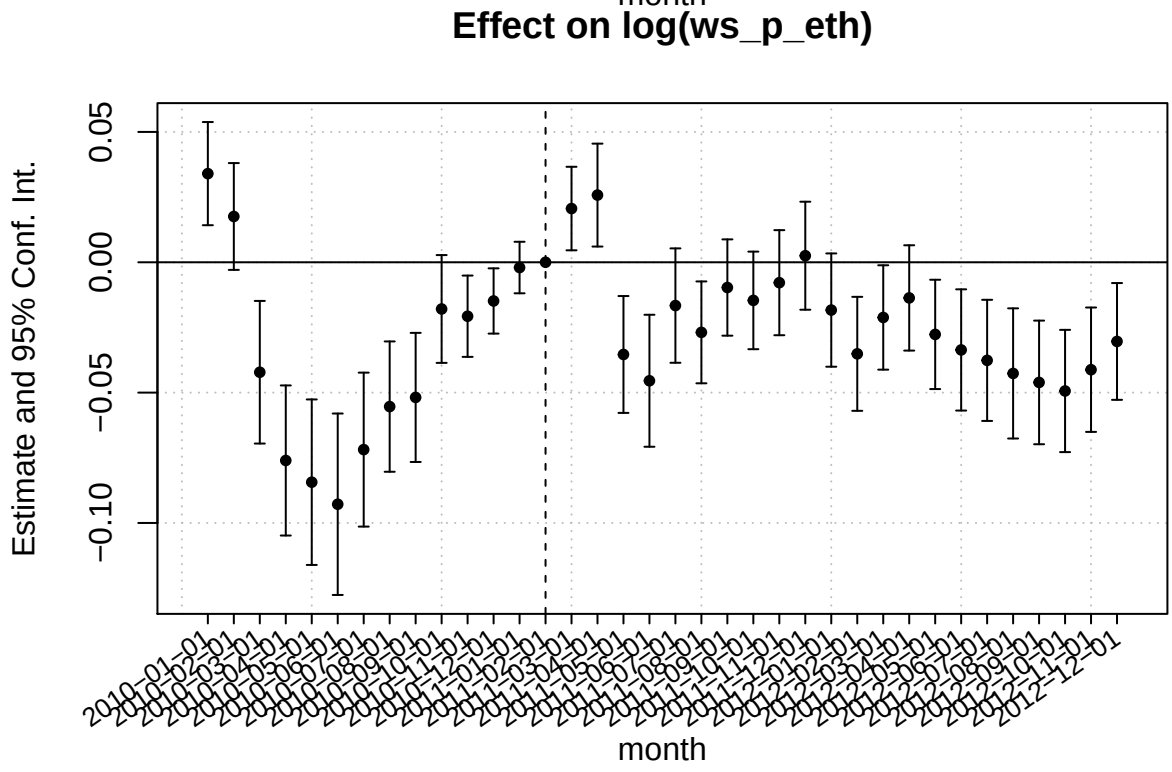

Effect on ws_p_gas
Estimate and 95% Conf. Int.
0.06
0.04
0.02
−0.02
month

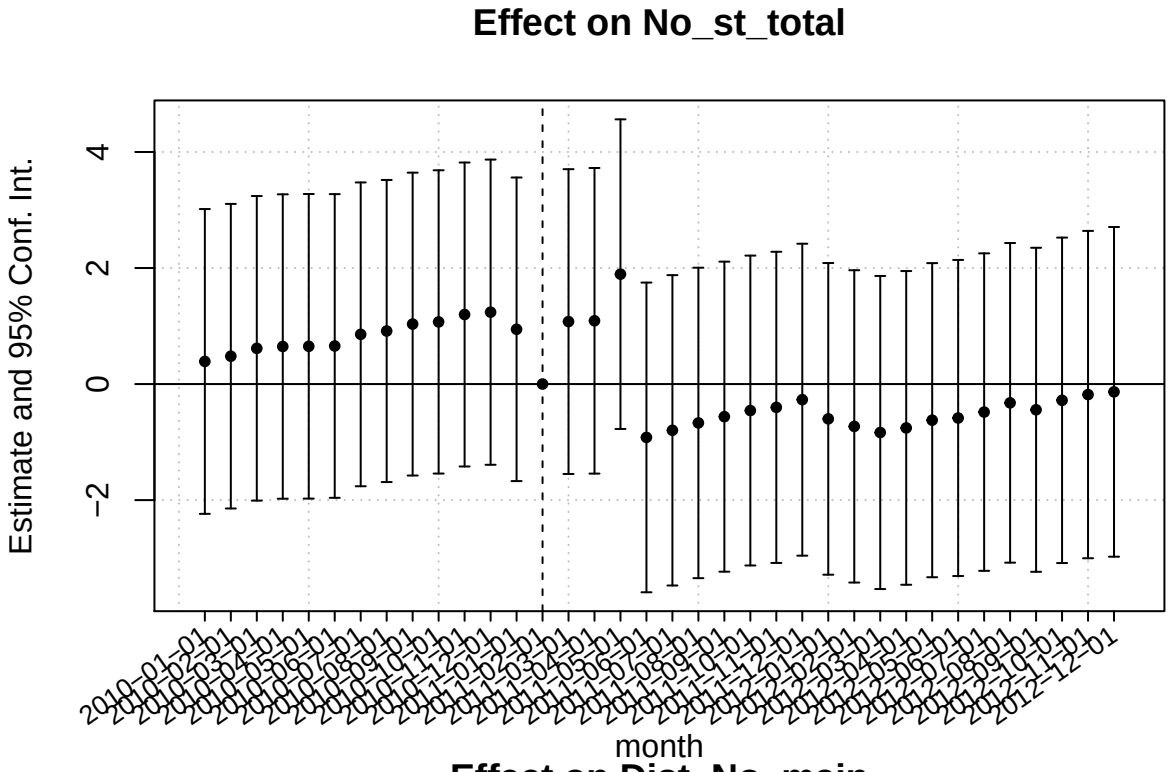

Effect on ws_p_eth
Estimate and 95% Conf. Int.
0.05
−0.05
−0.15
month

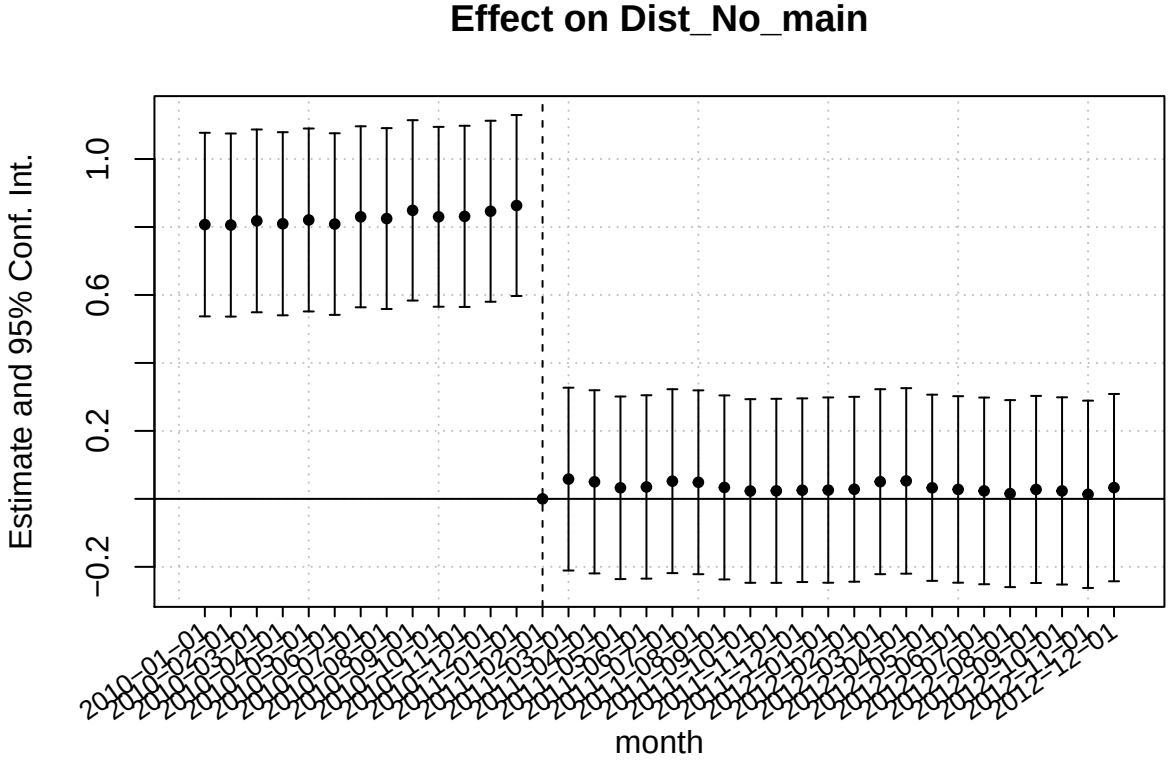

Effect on log(retail_p_gas)
Estimate and 95% Conf. Int.
−0.02
0.00
0.02
month

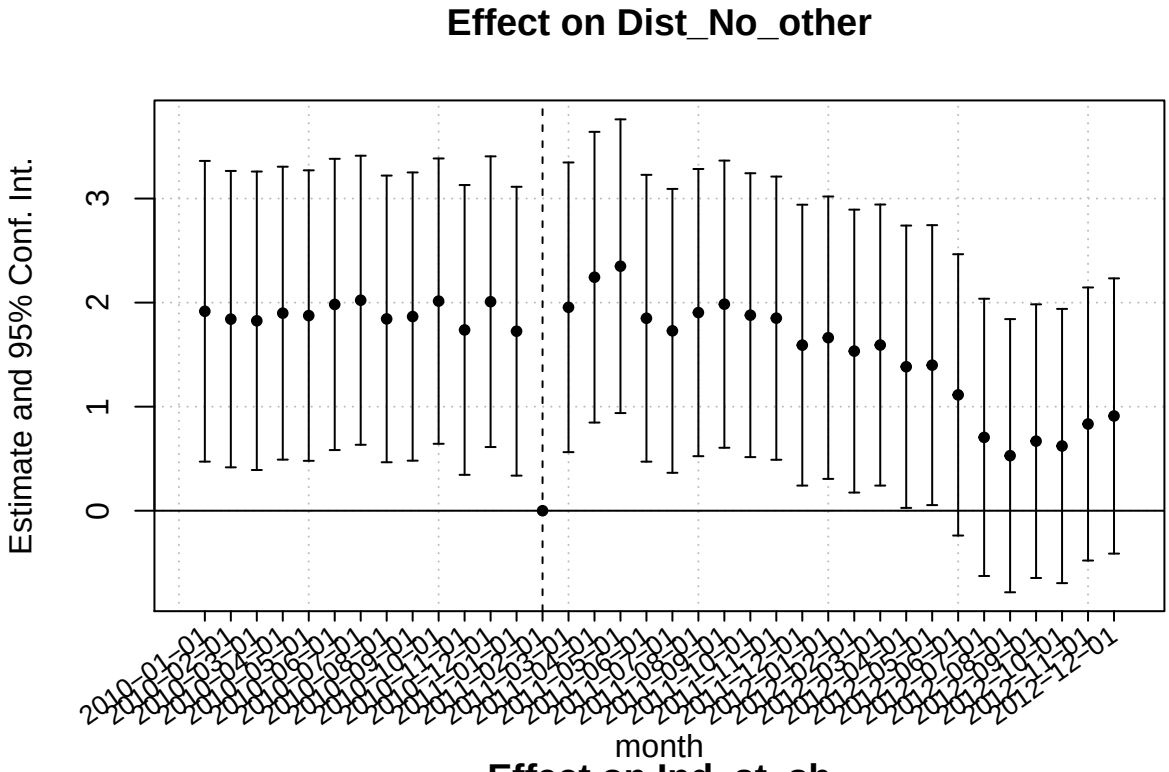

Effect on log(retail_p_eth)
Estimate and 95% Conf. Int.
−0.10
−0.05
0.00
0.05
month

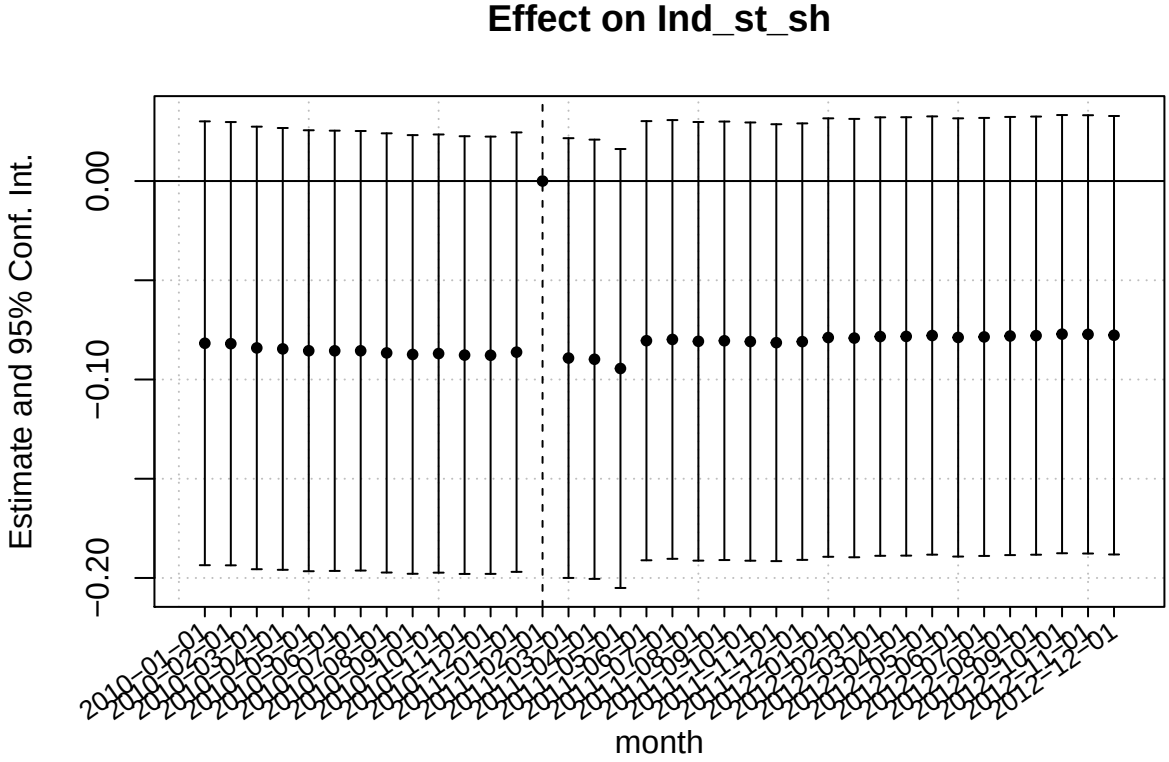

Effect on log(ws_p_gas)
Estimate and 95% Conf. Int.
−0.01
0.00
0.01
0.02
0.03
month

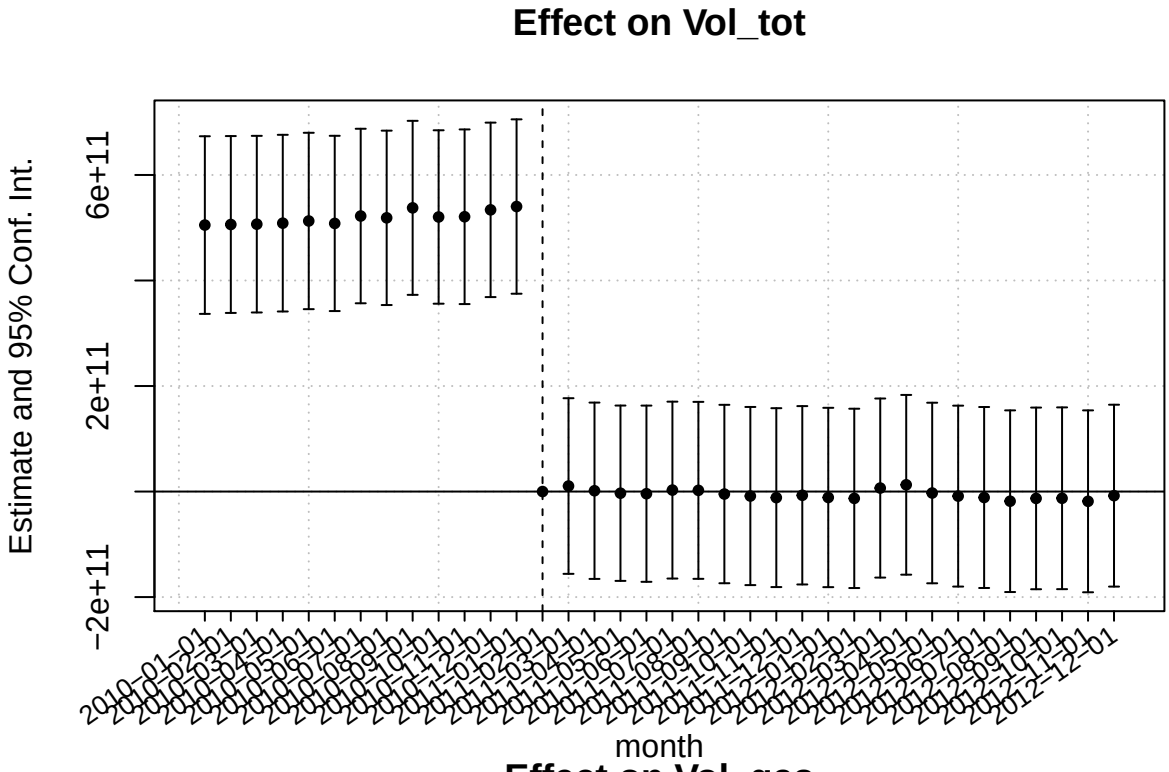

Effect on log(ws_p_eth)
Estimate and 95% Conf. Int.
−0.10
−0.05
0.00
0.05
month

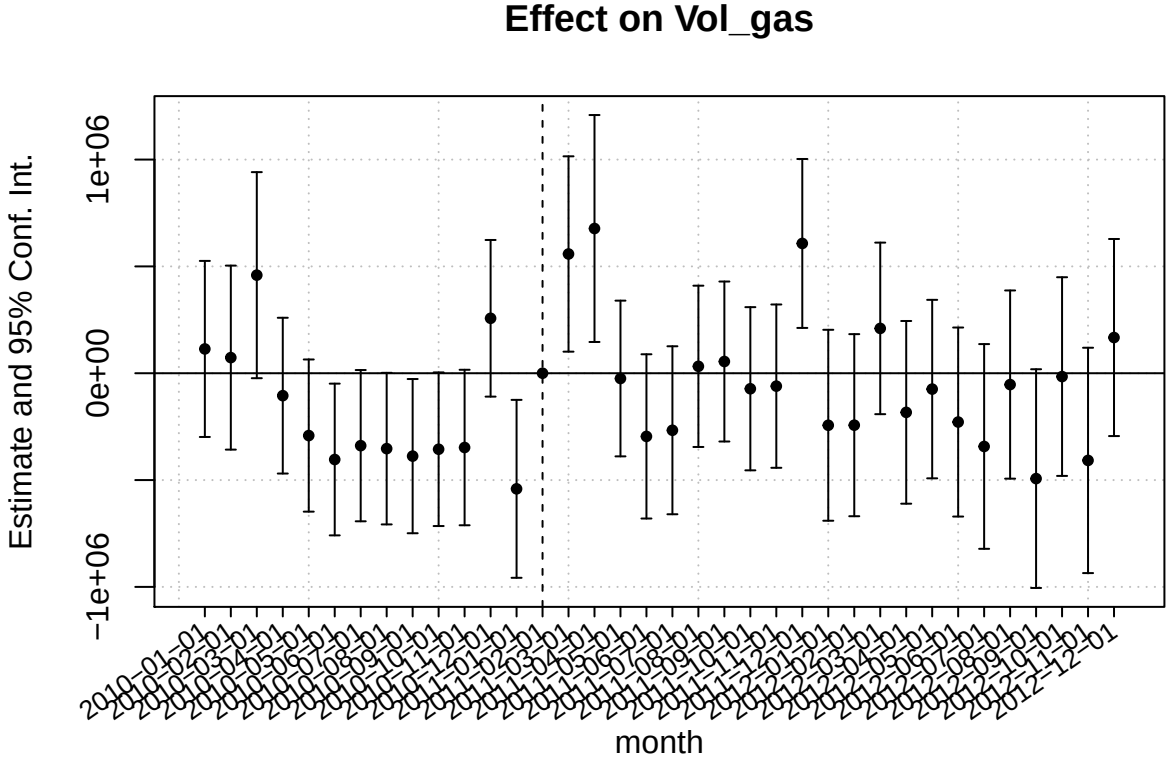

Effect on No_st_total
Estimate and 95% Conf. Int.
4
2
0
−2
month

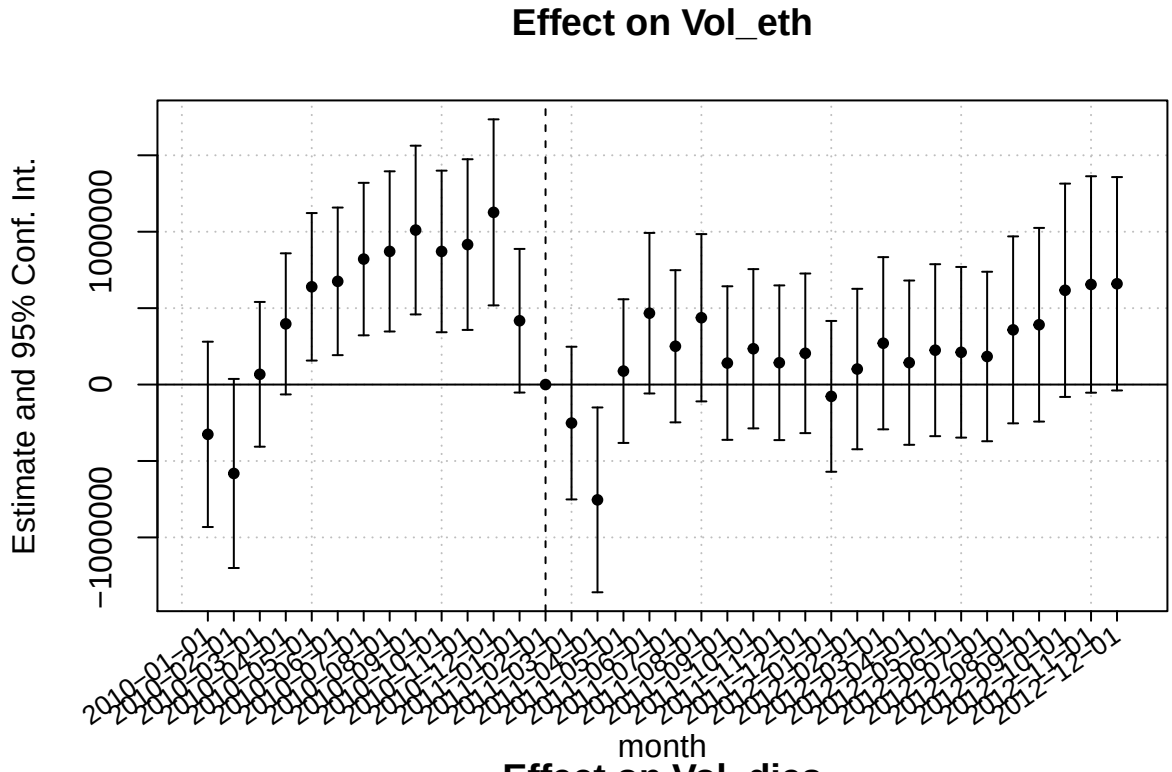

Effect on Dist_No_main
Estimate and 95% Conf. Int.
1.0
0.6
0.2
−0.2
month

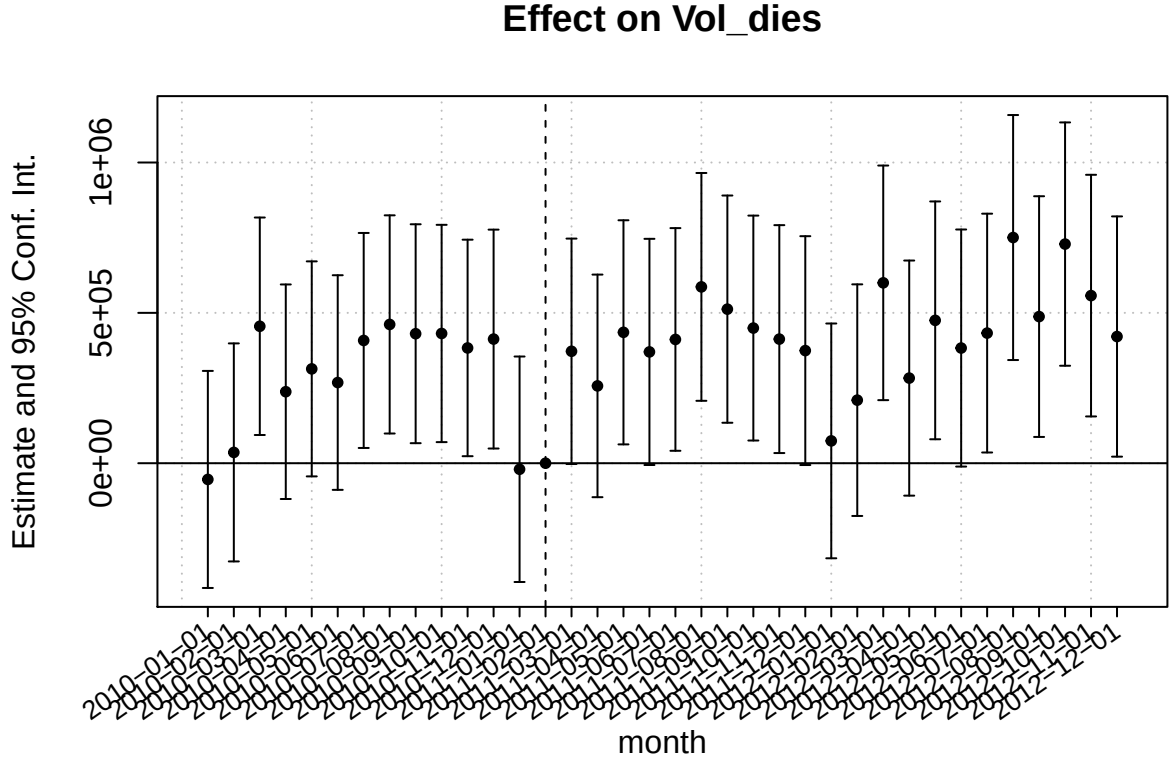

Effect on Dist_No_other
Estimate and 95% Conf. Int.
0
1
2
3
month

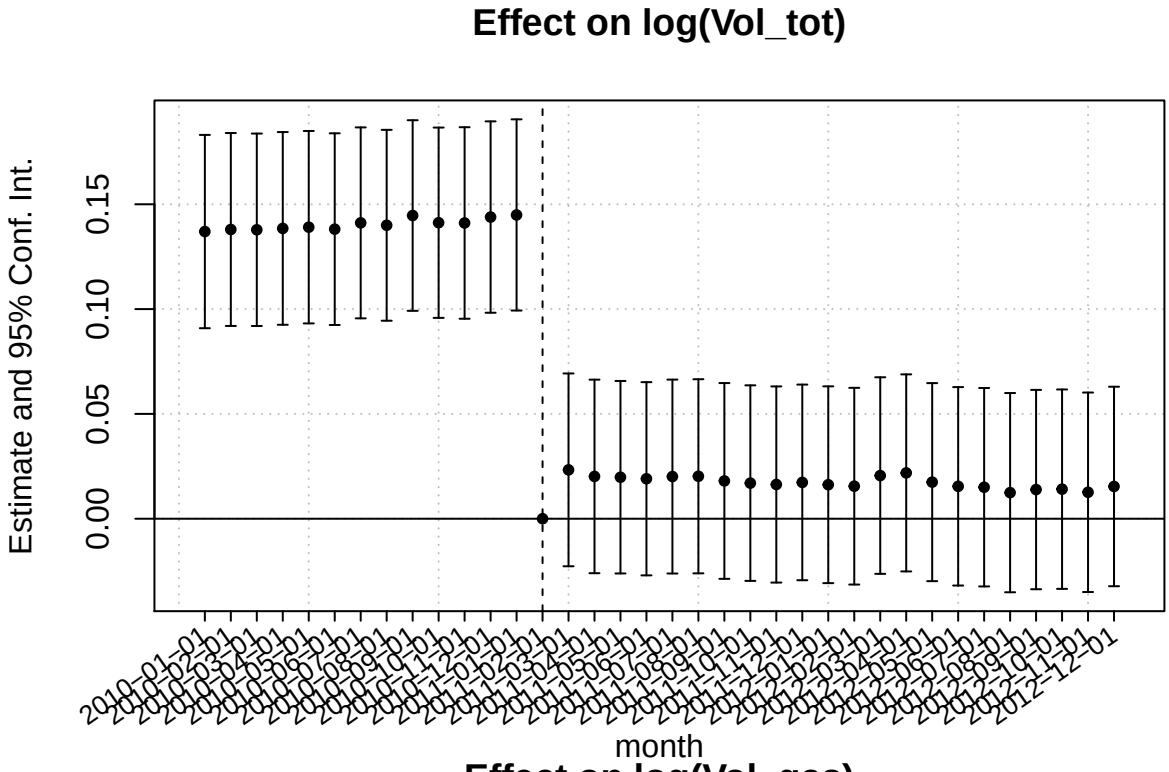

Effect on Ind_st_sh
Estimate and 95% Conf. Int.
−0.20
−0.10
0.00
month

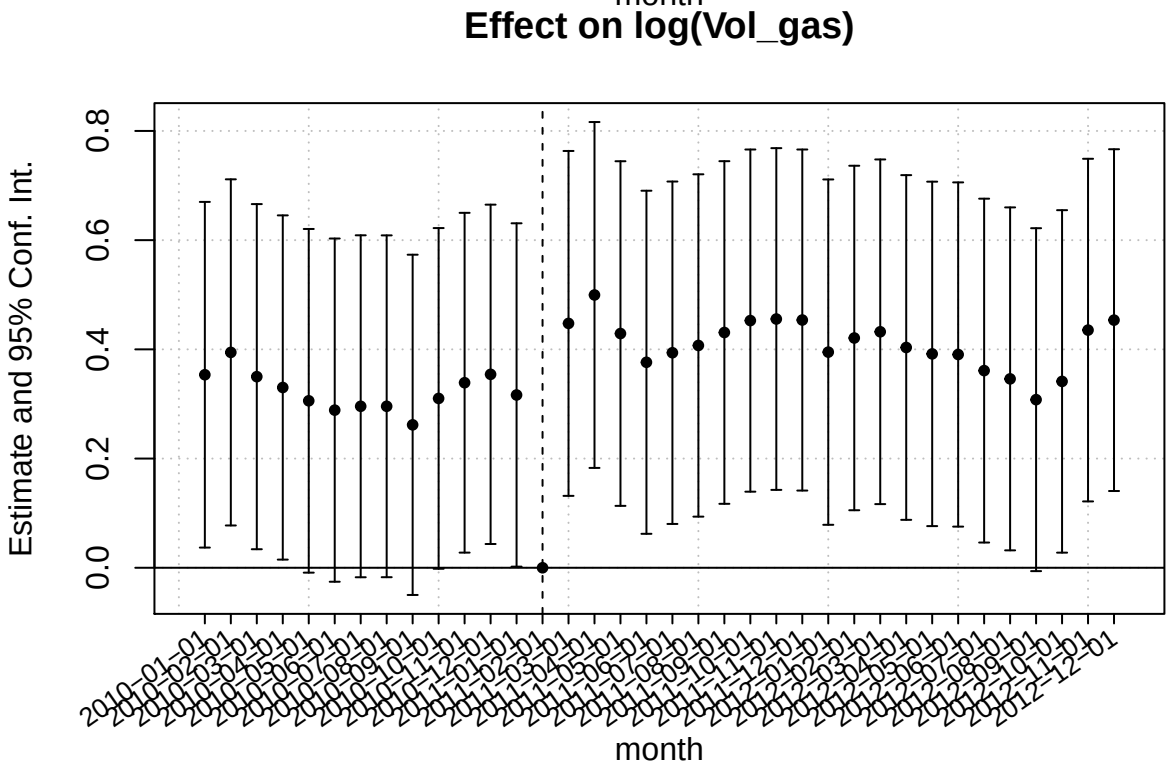

Effect on Vol_tot
Estimate and 95% Conf. Int.
6e+11
2e+11
−2e+11
month

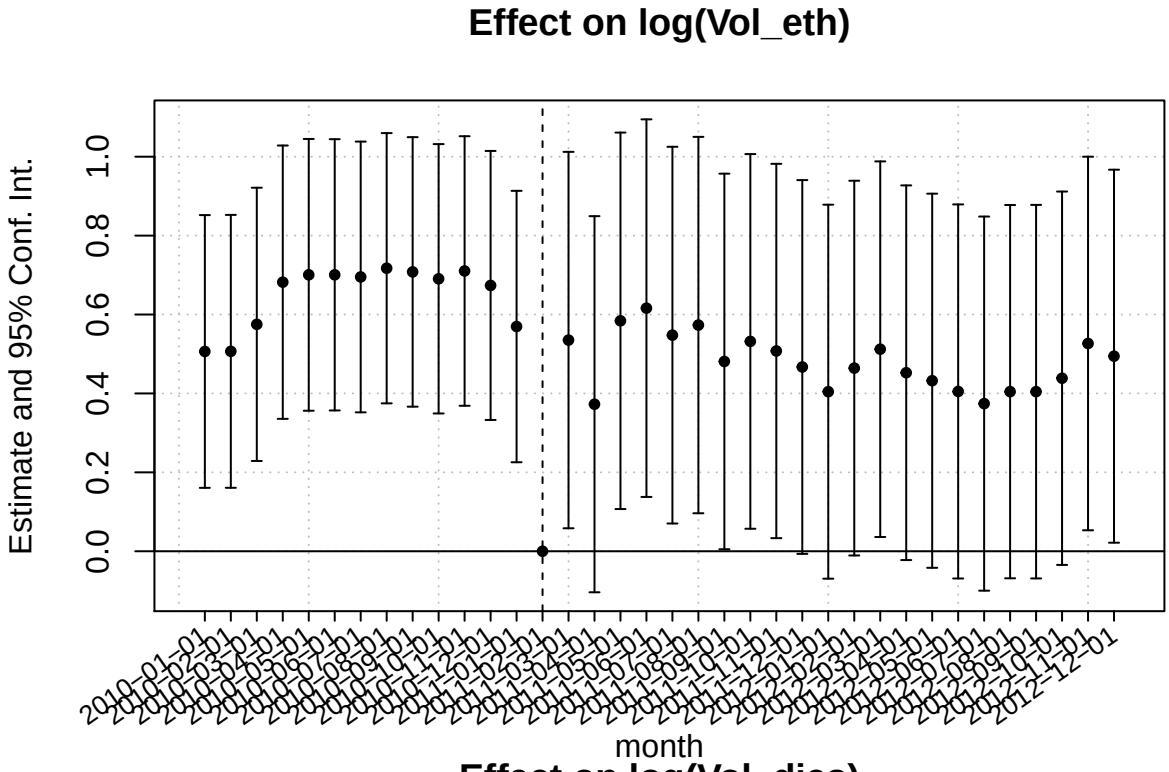

Effect on Vol_gas
Estimate and 95% Conf. Int.
1e+06
0e+00
−1e+06
month

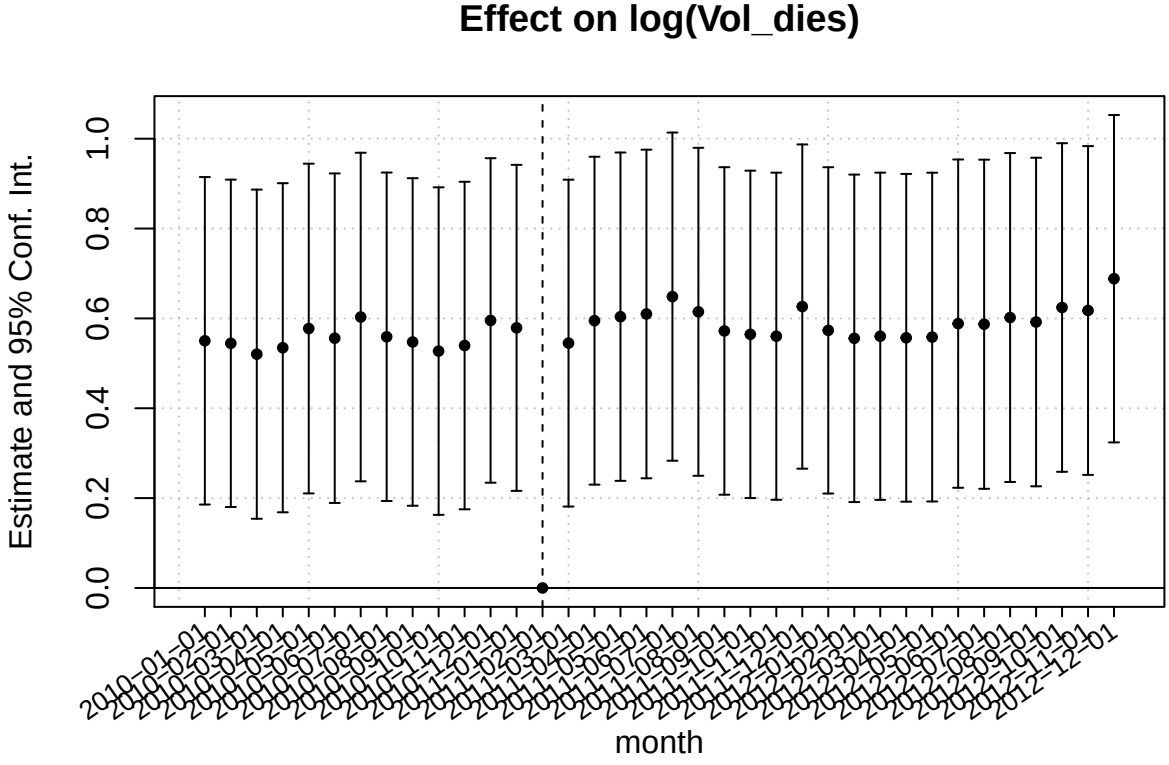

Effect on Vol_eth
Estimate and 95% Conf. Int.
−1000000
0
1000000
month

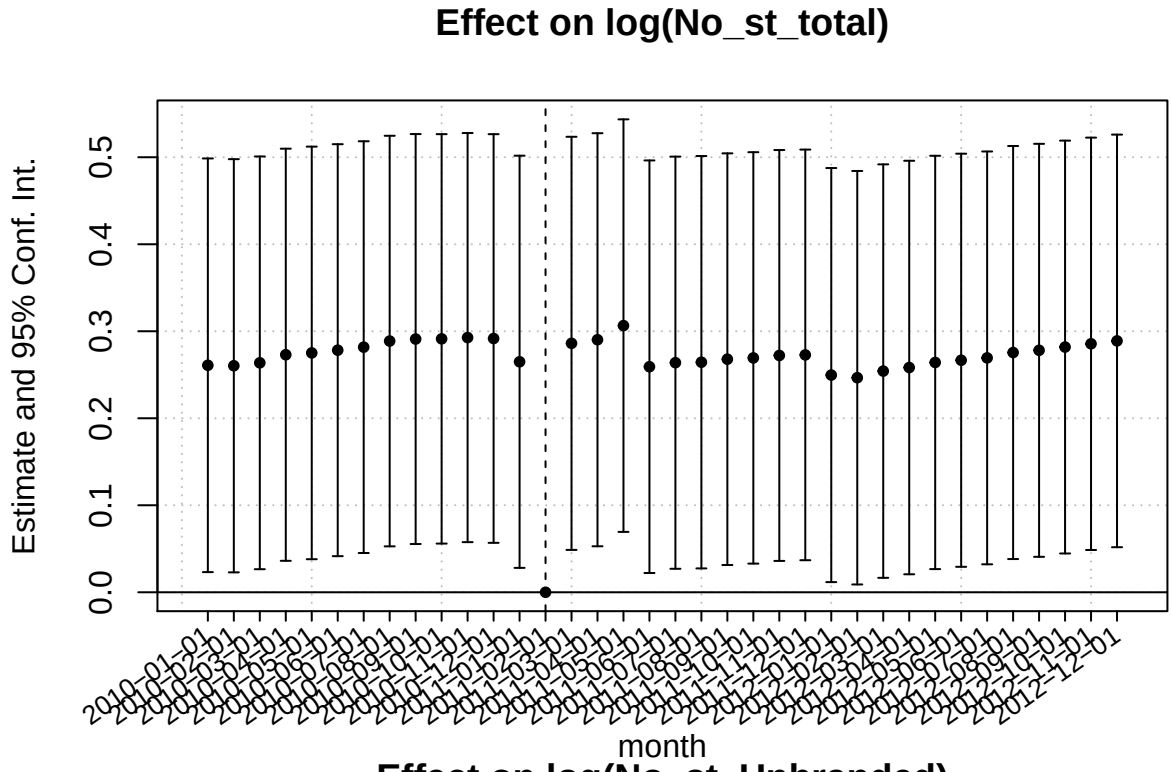

Effect on Vol_dies
Estimate and 95% Conf. Int.
0e+00
5e+05
1e+06
month

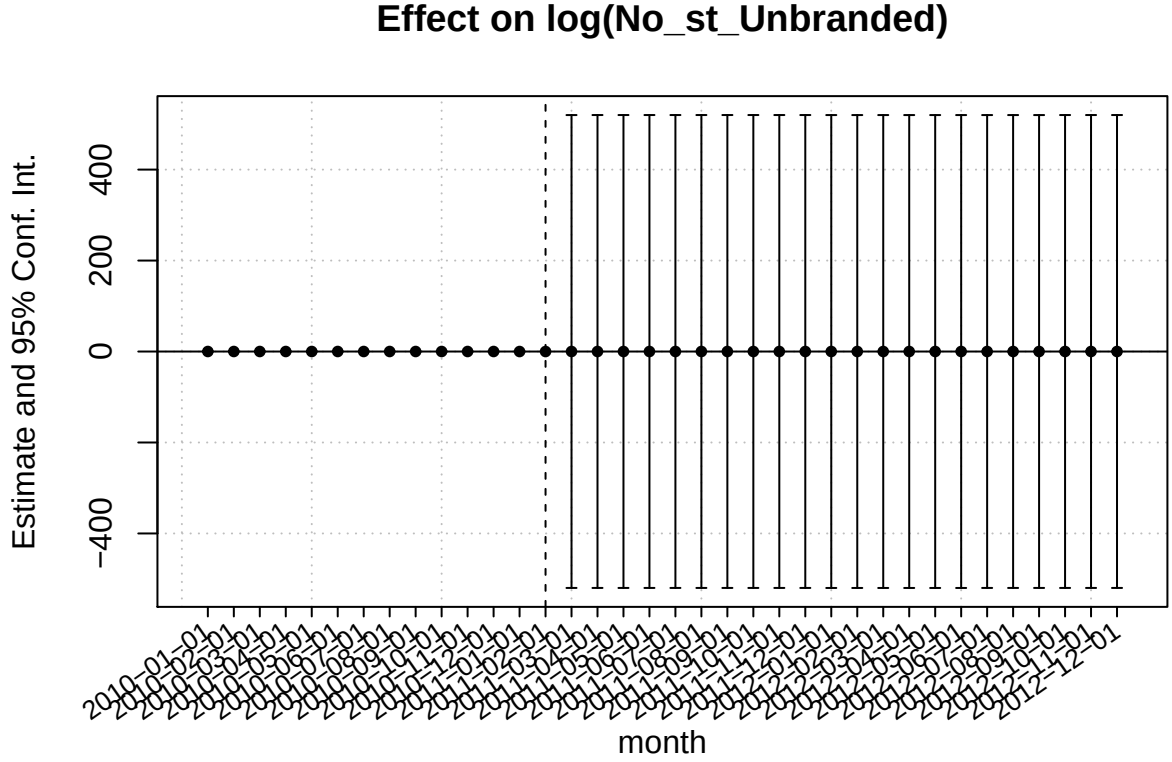

Effect on log(Vol_tot)
Estimate and 95% Conf. Int.
0.00
0.05
0.10
0.15
month


Effect on log(Vol_gas)
Estimate and 95% Conf. Int.
0.0
0.2
0.4
0.6
0.8
month

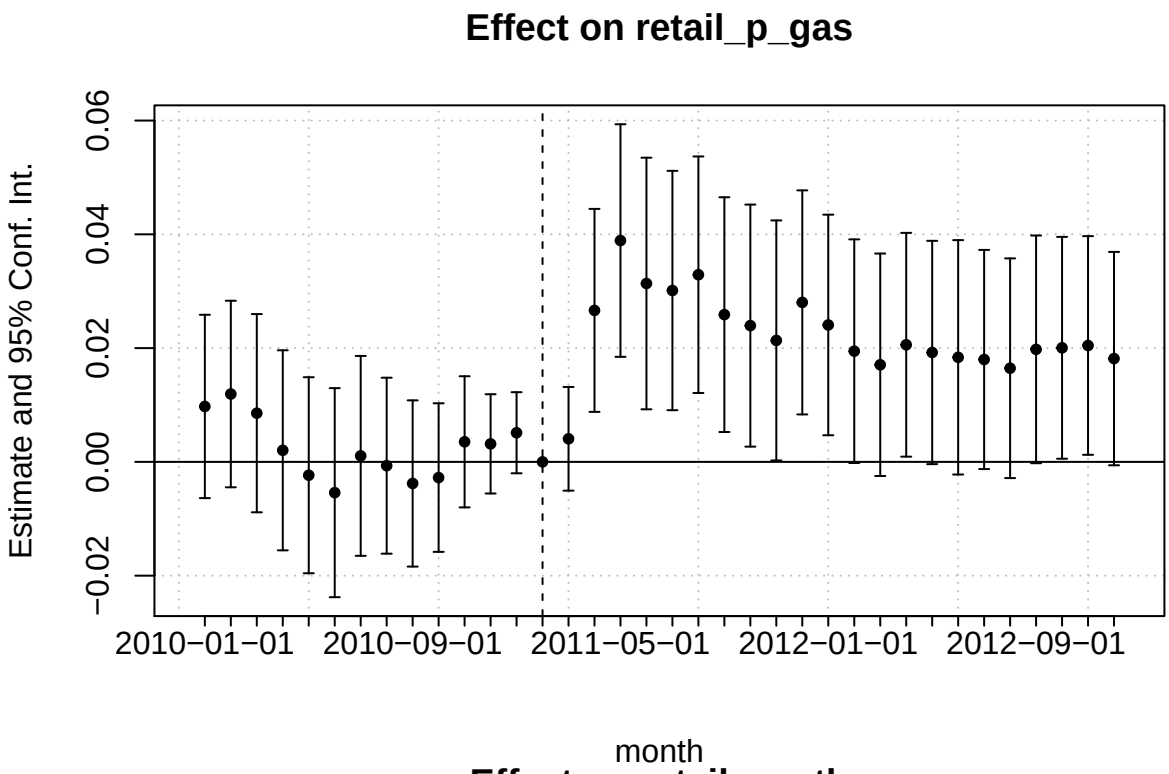

Effect on log(Vol_eth)
Estimate and 95% Conf. Int.
0.0
0.2
0.4
0.6
0.8
1.0
month

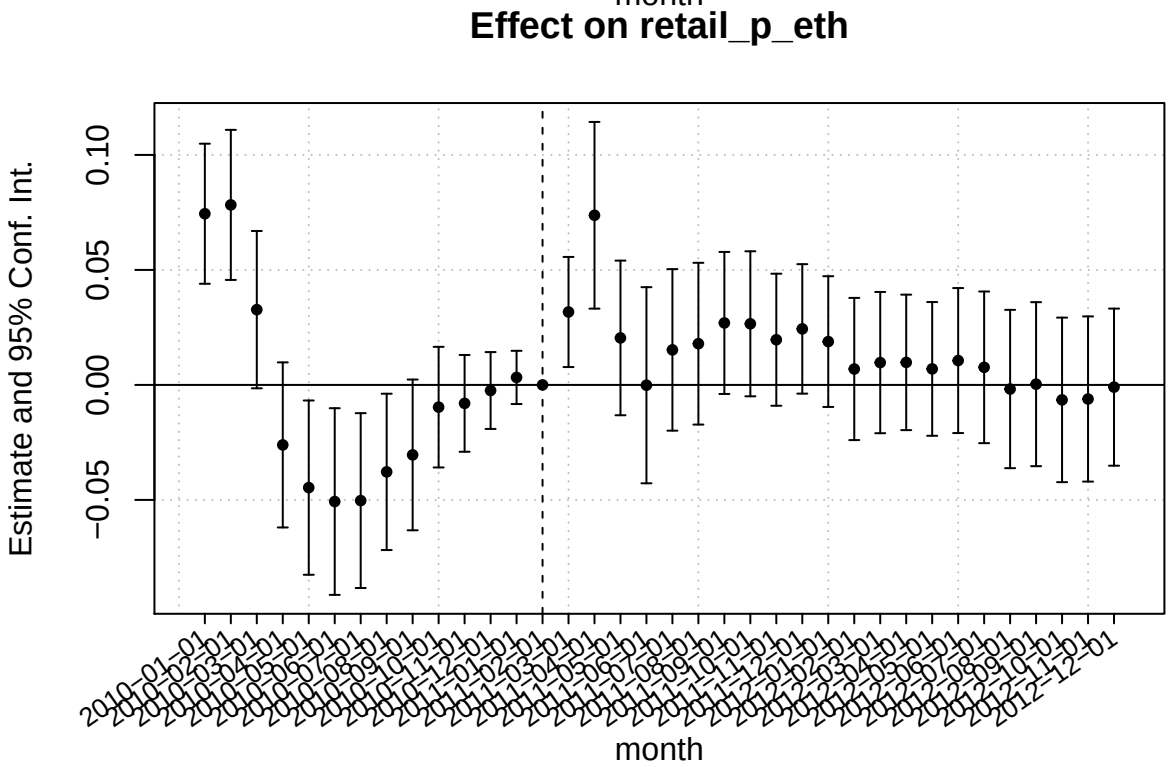

Effect on log(Vol_dies)
Estimate and 95% Conf. Int.
0.0
0.2
0.4
0.6
0.8
1.0
month

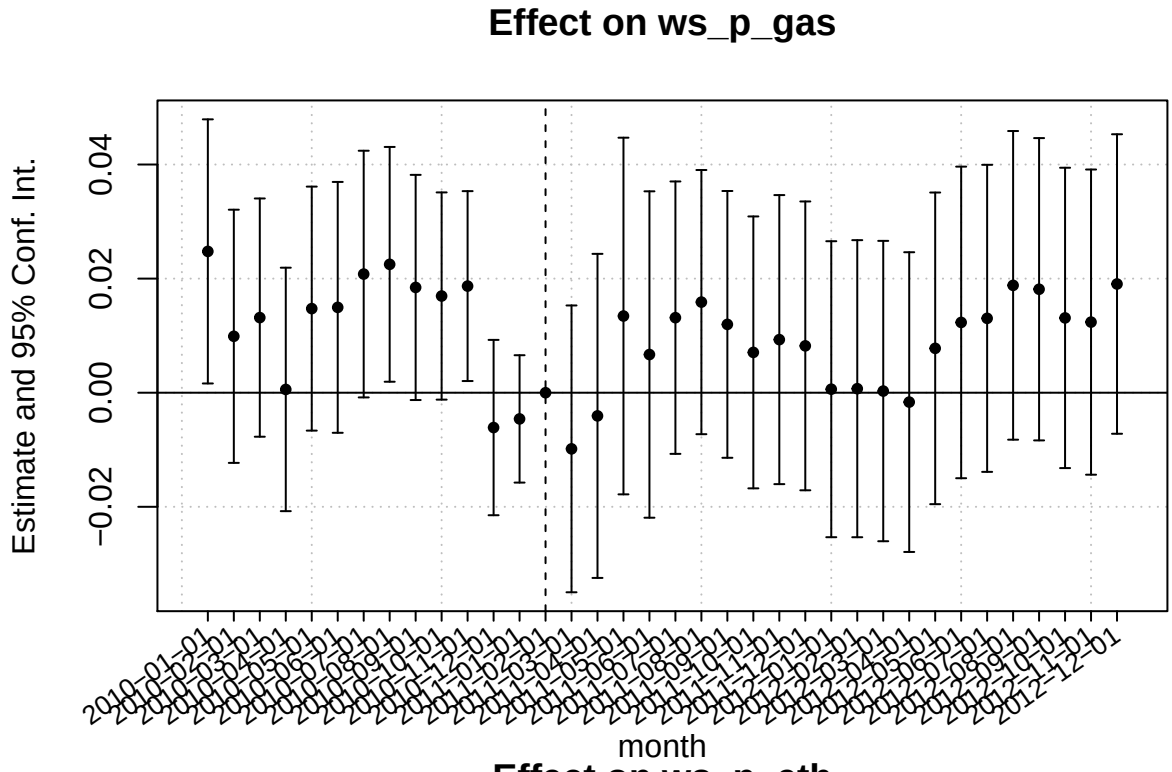

Effect on log(No_st_total)
Estimate and 95% Conf. Int.
0.0
0.1
0.2
0.3
0.4
0.5
month

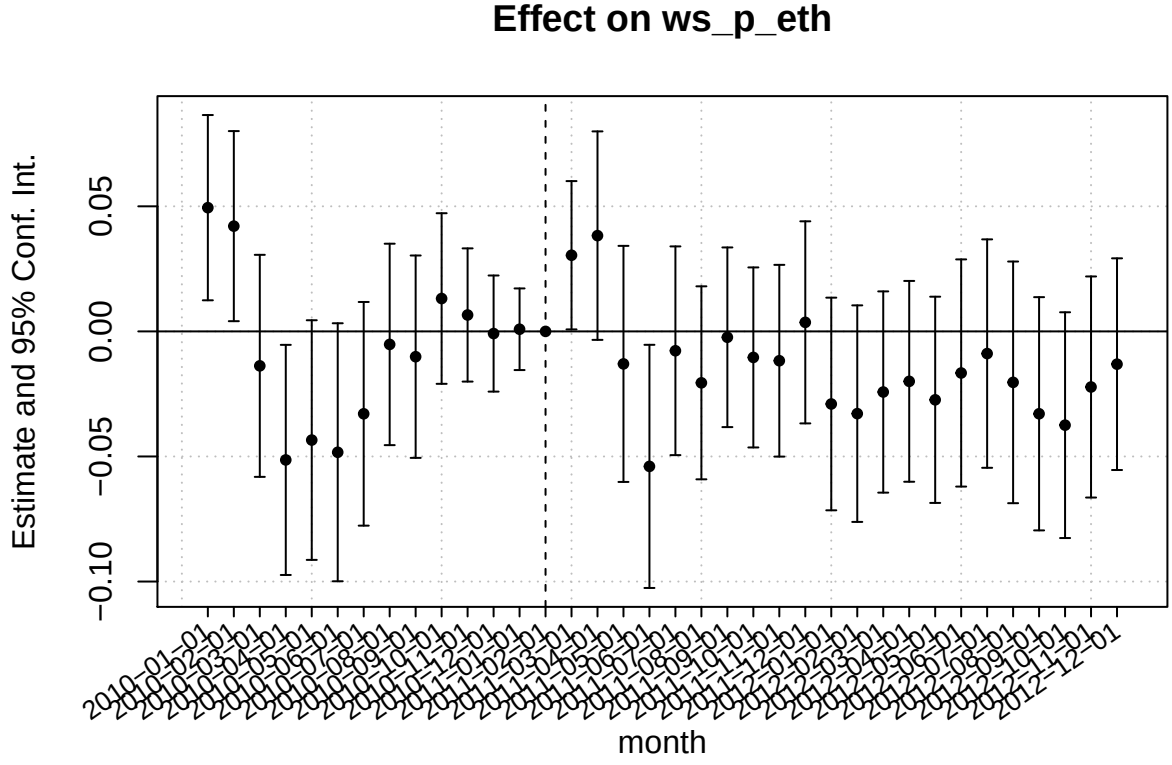

Effect on log(No_st_Unbranded)
Estimate and 95% Conf. Int.
−400
0
200
400
month

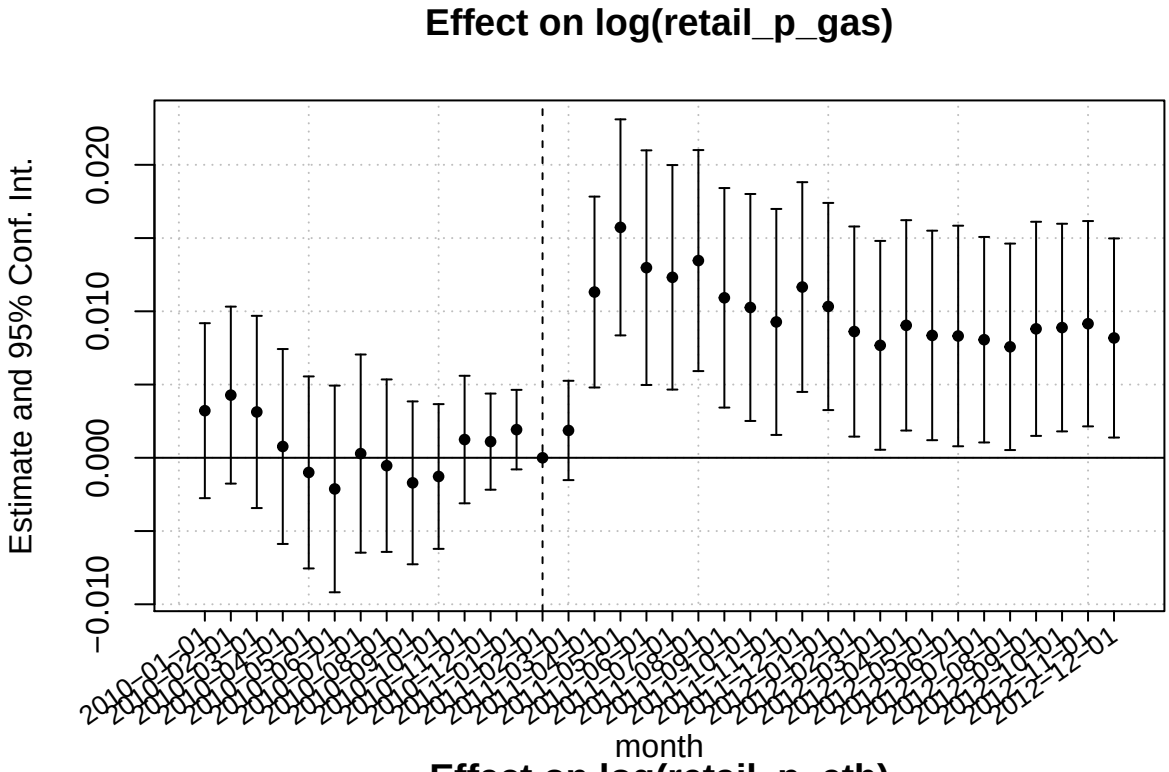
**Just One as treatment, None as control**

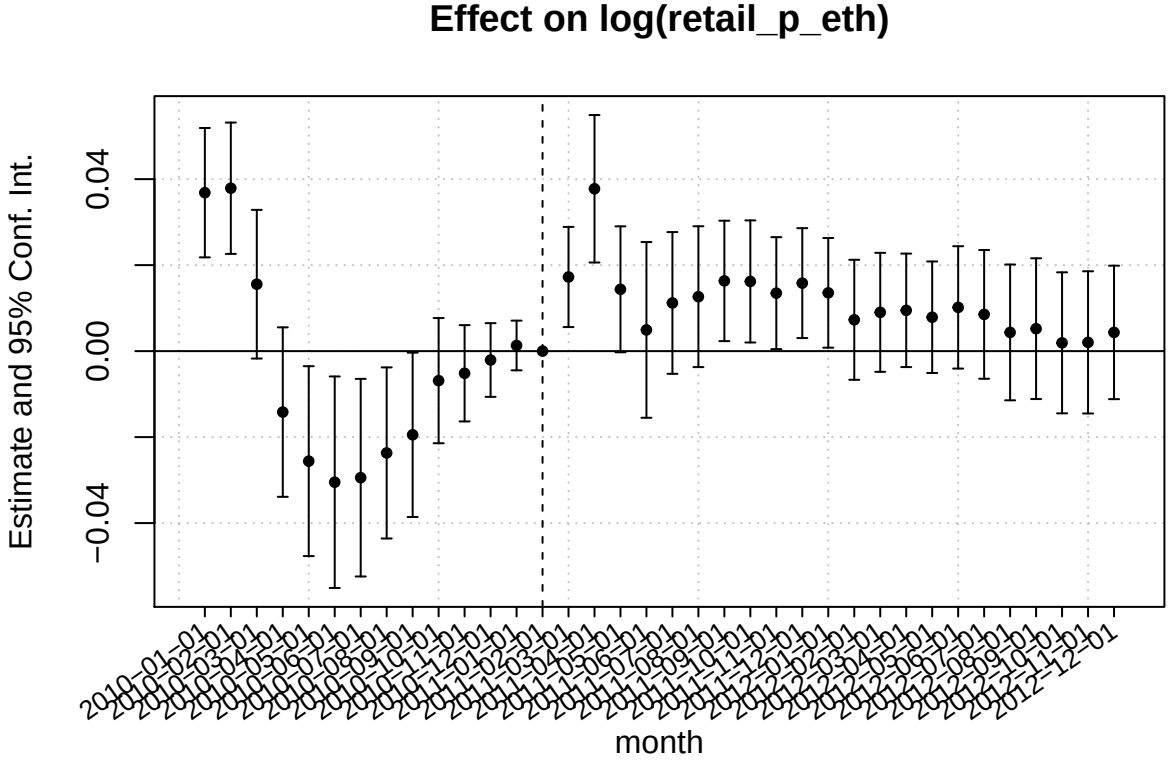


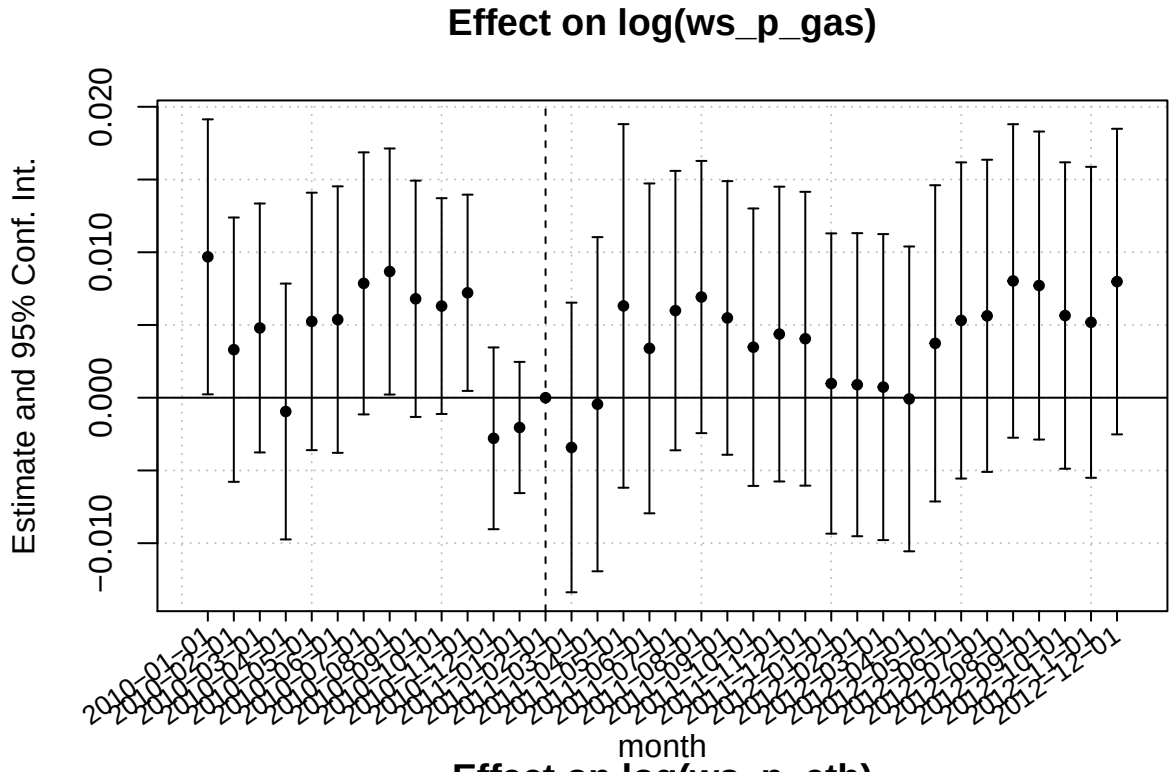



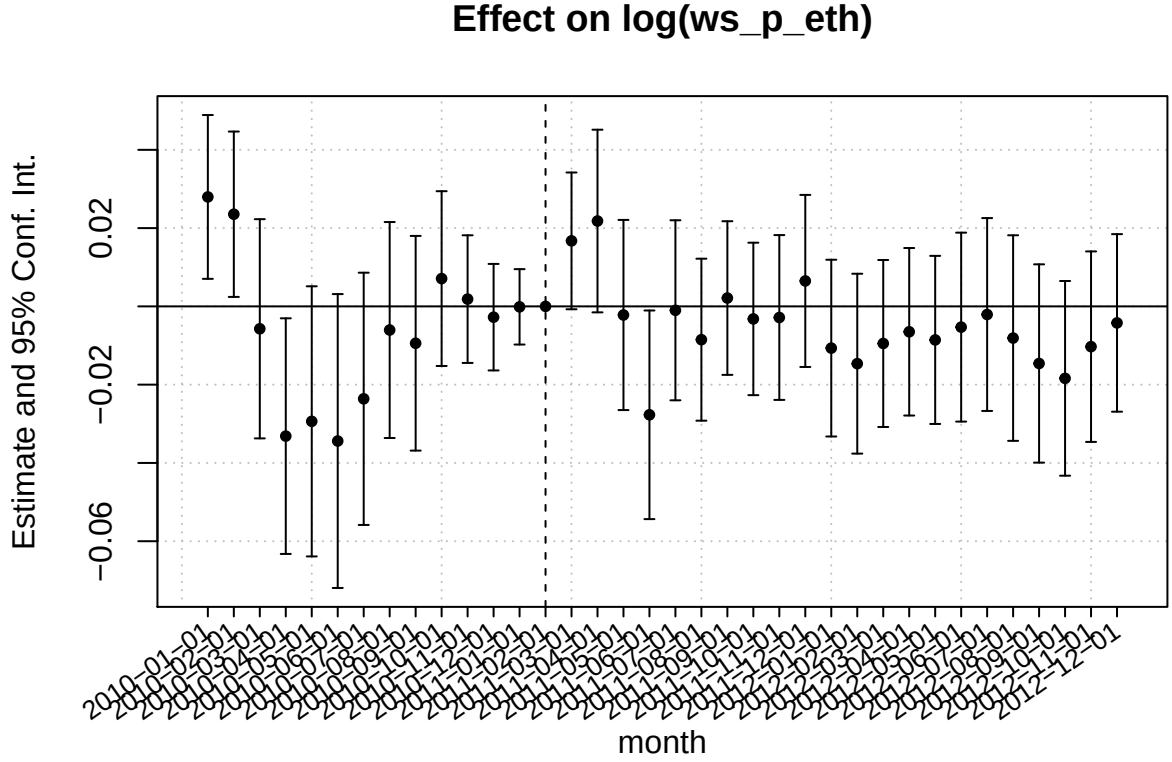

Effect on ws_p_gas
Estimate and 95% Conf. Int.
−0.02
0.00
0.02
0.04
month

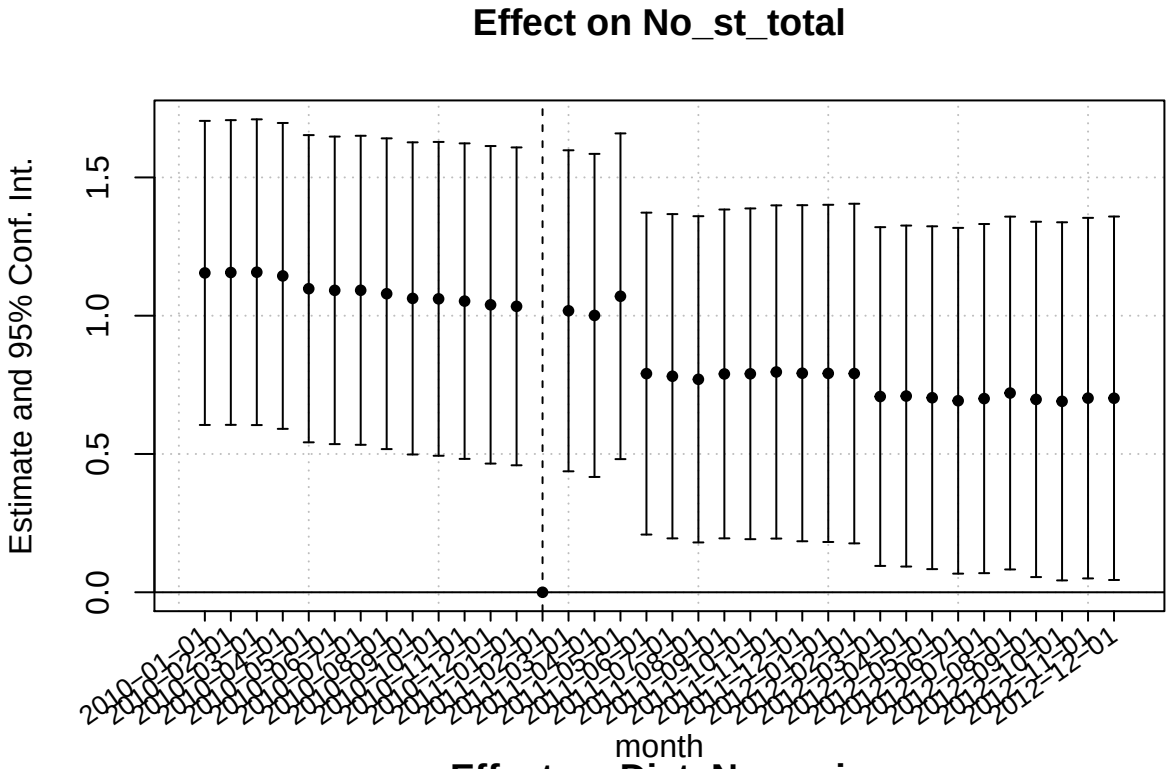

Effect on ws_p_eth
Estimate and 95% Conf. Int.
−0.10
−0.05
0.00
0.05
month

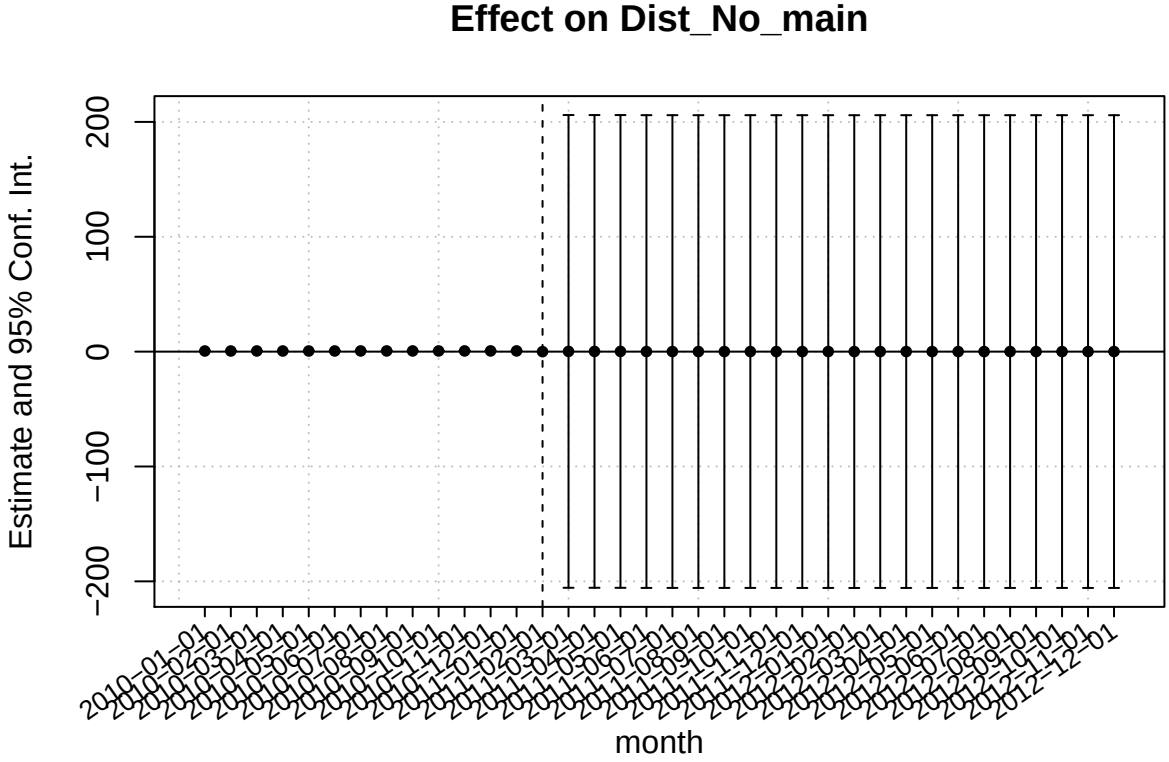

Effect on log(retail_p_gas)
Estimate and 95% Conf. Int.
−0.010
0.000
0.010
0.020
month

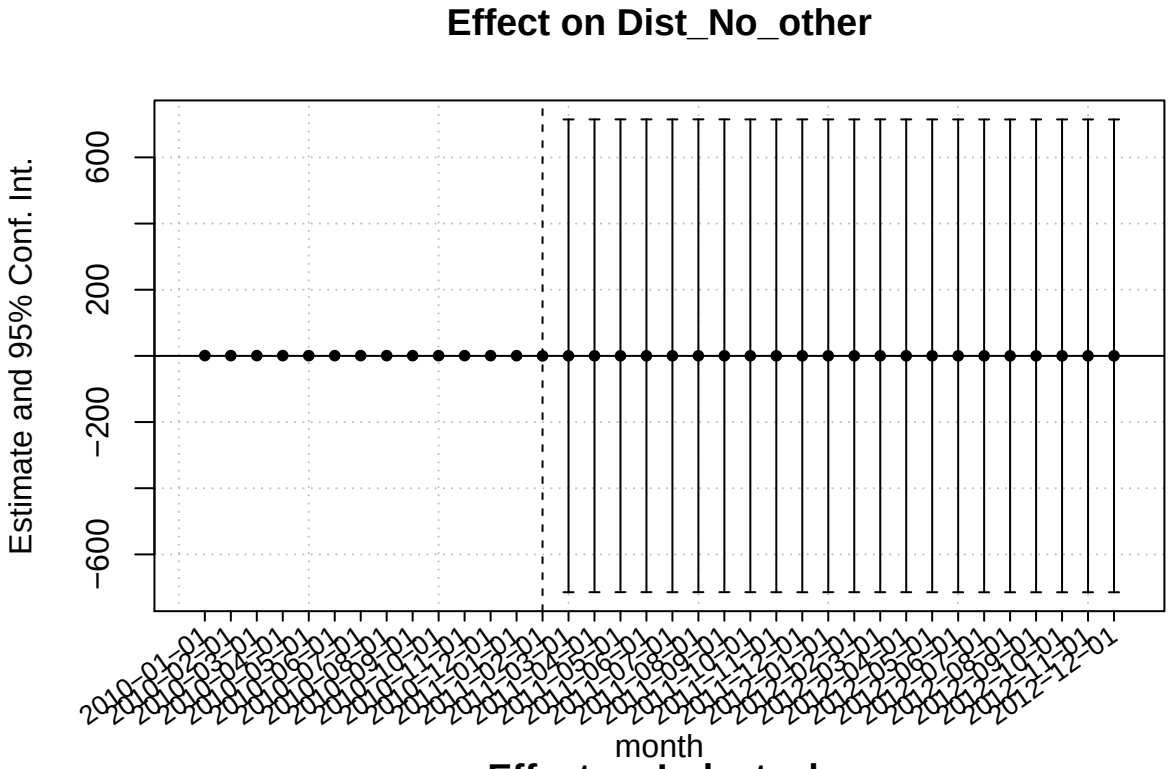

Effect on log(retail_p_eth)
Estimate and 95% Conf. Int.
−0.04
0.00
0.04
month

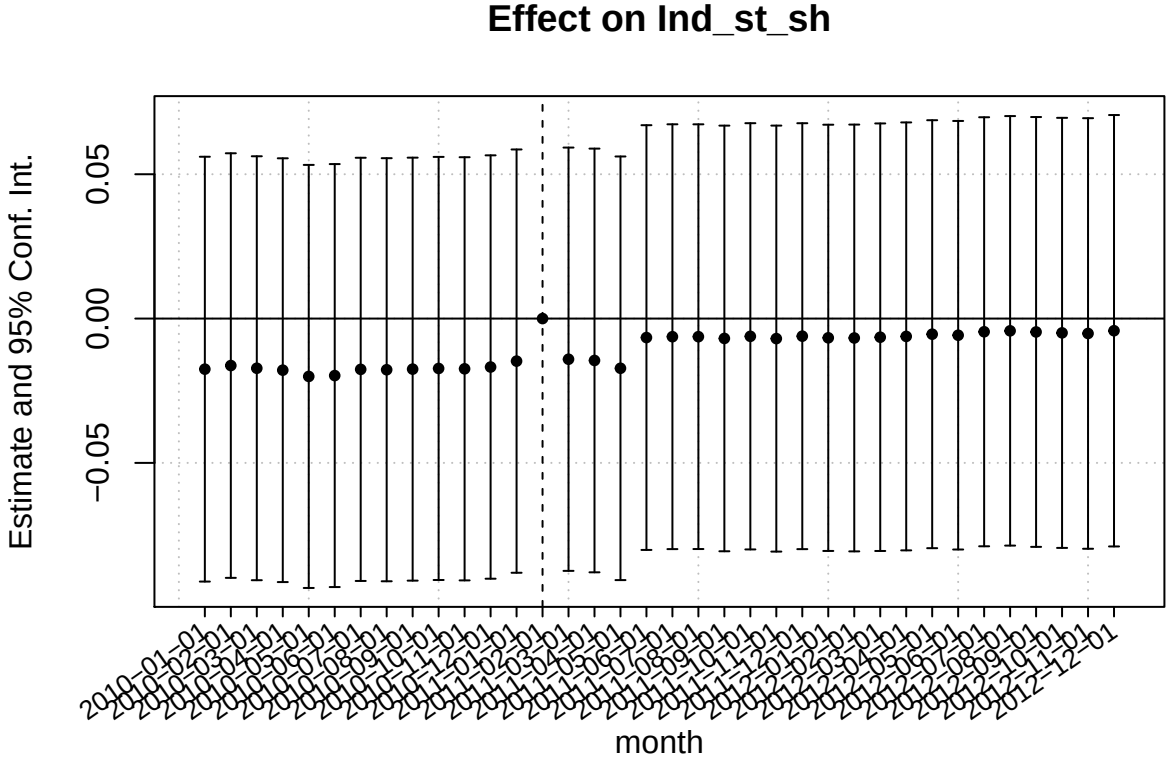

Effect on log(ws_p_gas)
Estimate and 95% Conf. Int.
0.020
0.010
0.000
−0.010
month

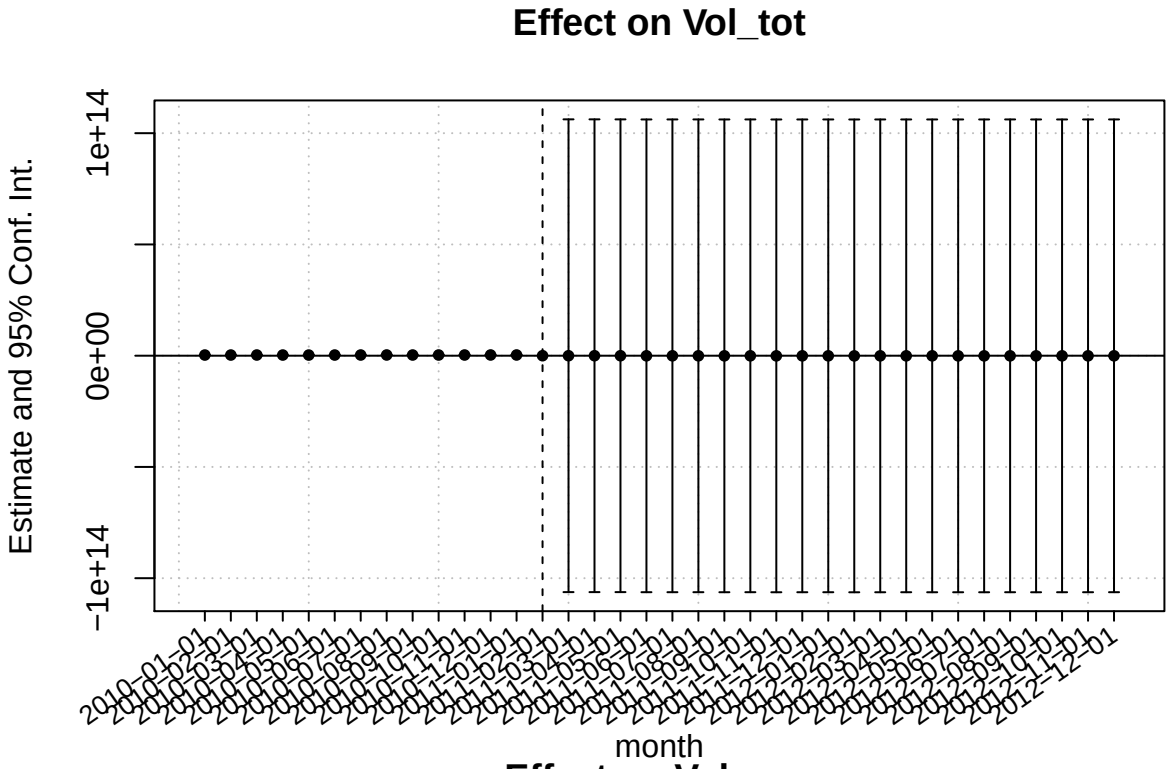

Effect on log(ws_p_eth)
Estimate and 95% Conf. Int.
0.02
−0.02
−0.06
month

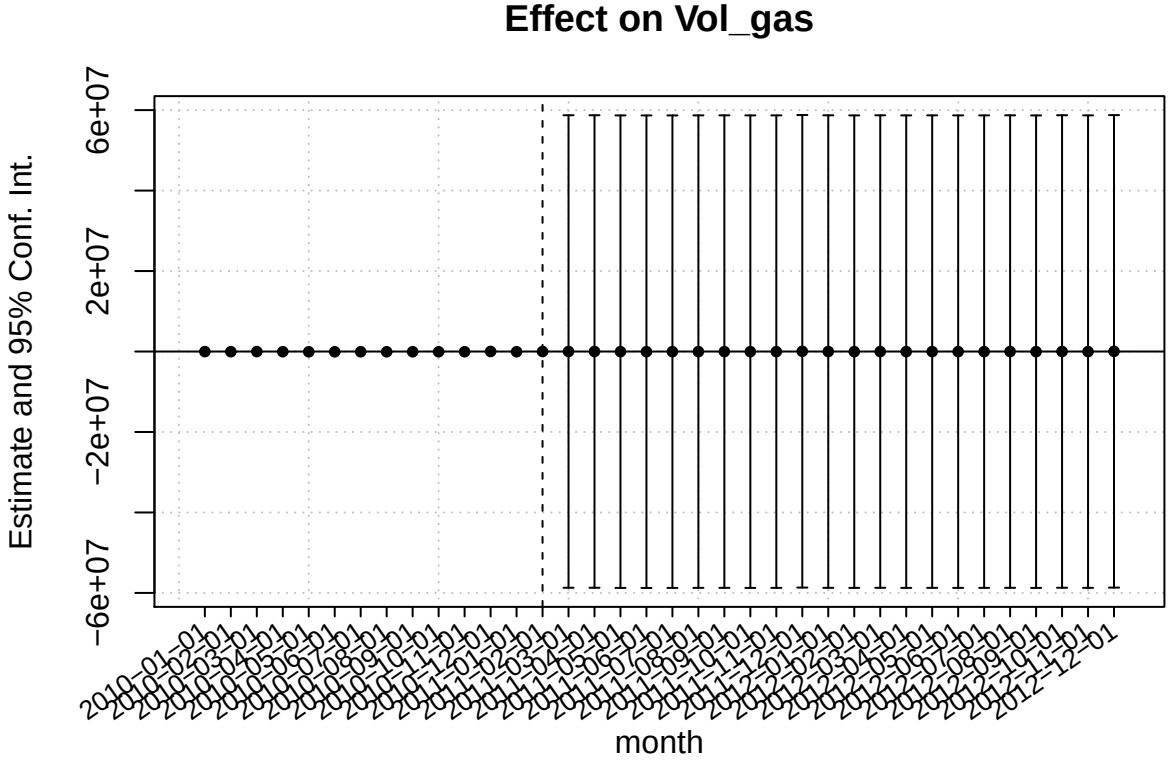

Effect on No_st_total
Estimate and 95% Conf. Int.
0.0
0.5
1.0
1.5
month

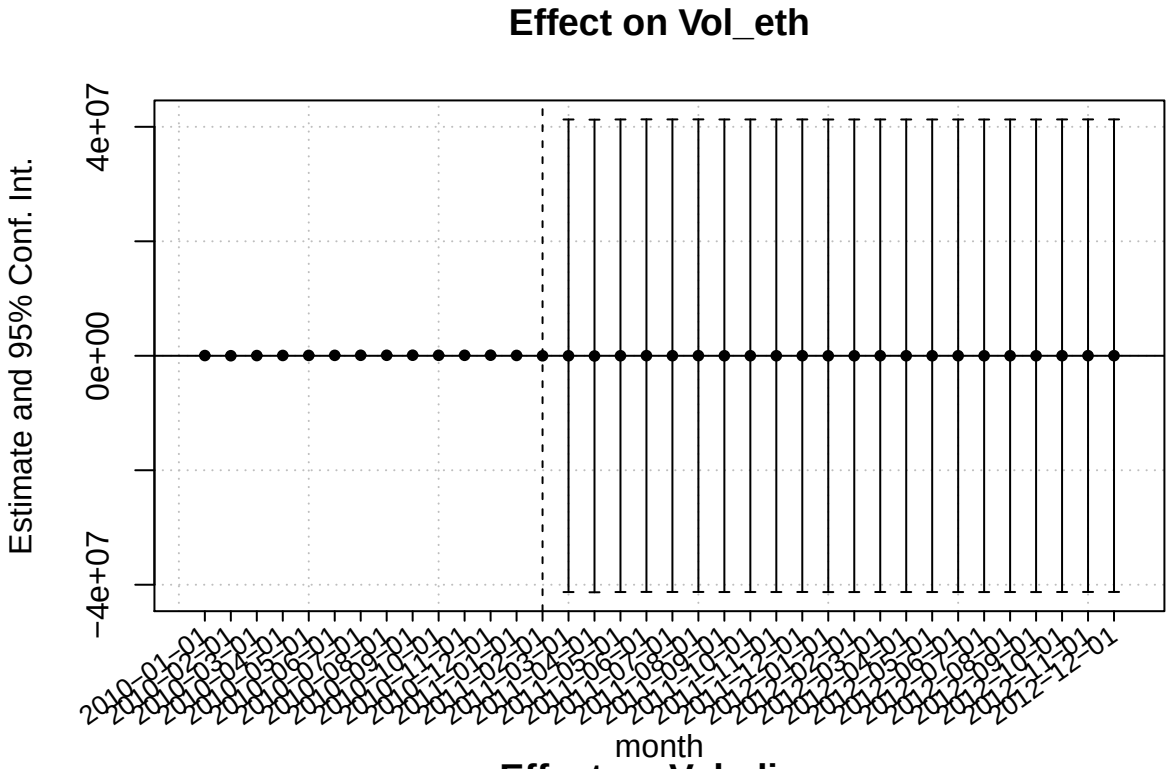

Effect on Dist_No_main
Estimate and 95% Conf. Int.
−200
−100
0
100
200
month

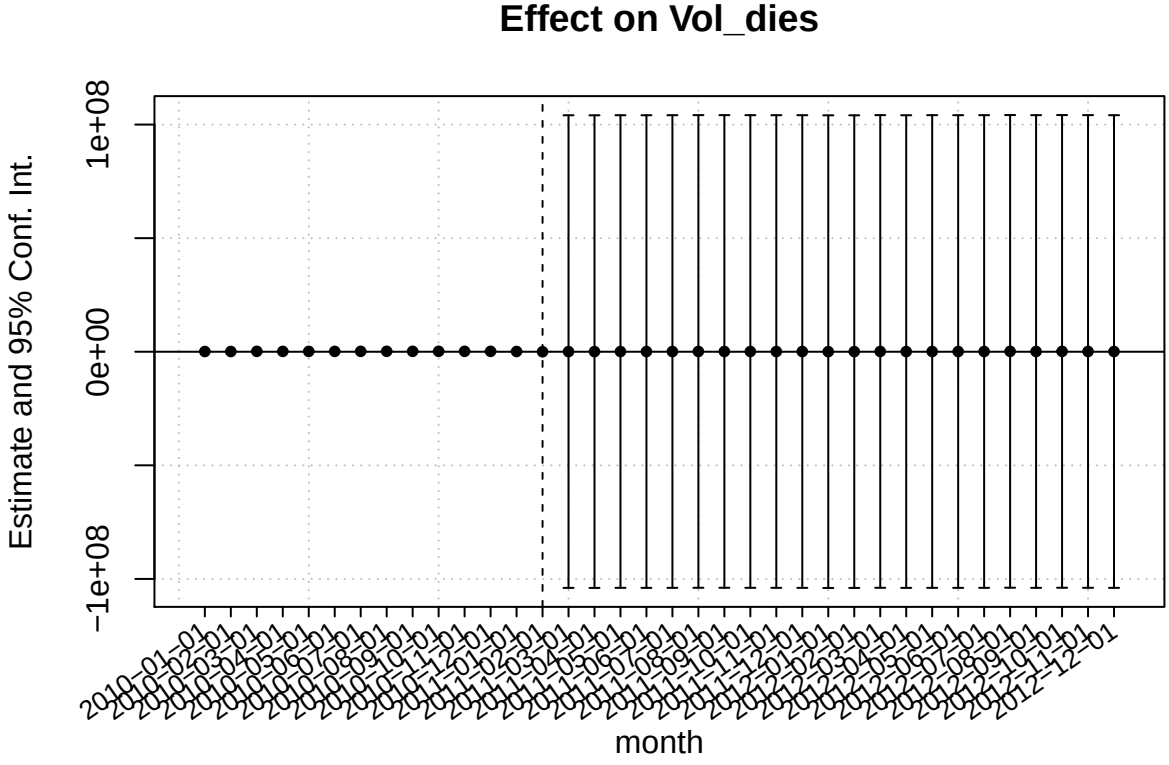

Effect on Dist_No_other
Estimate and 95% Conf. Int.
600
200
−200
−600
month

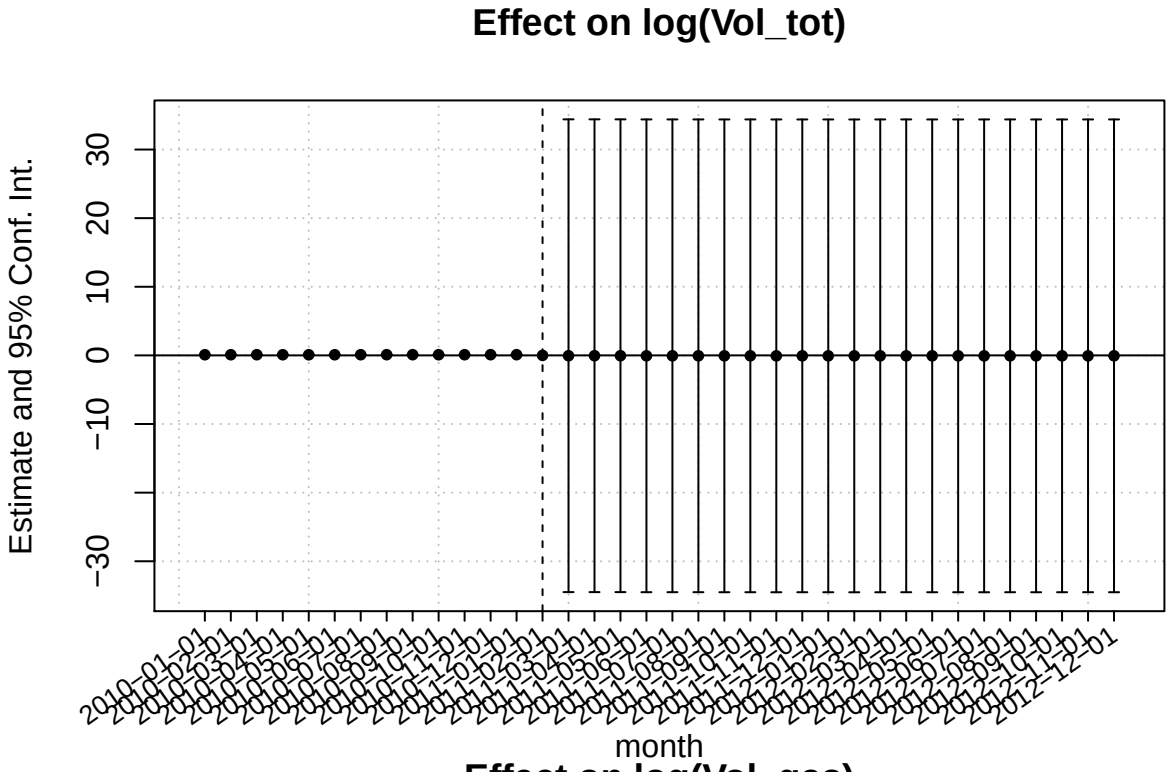

Effect on Ind_st_sh
Estimate and 95% Conf. Int.
0.05
0.00
−0.05
month

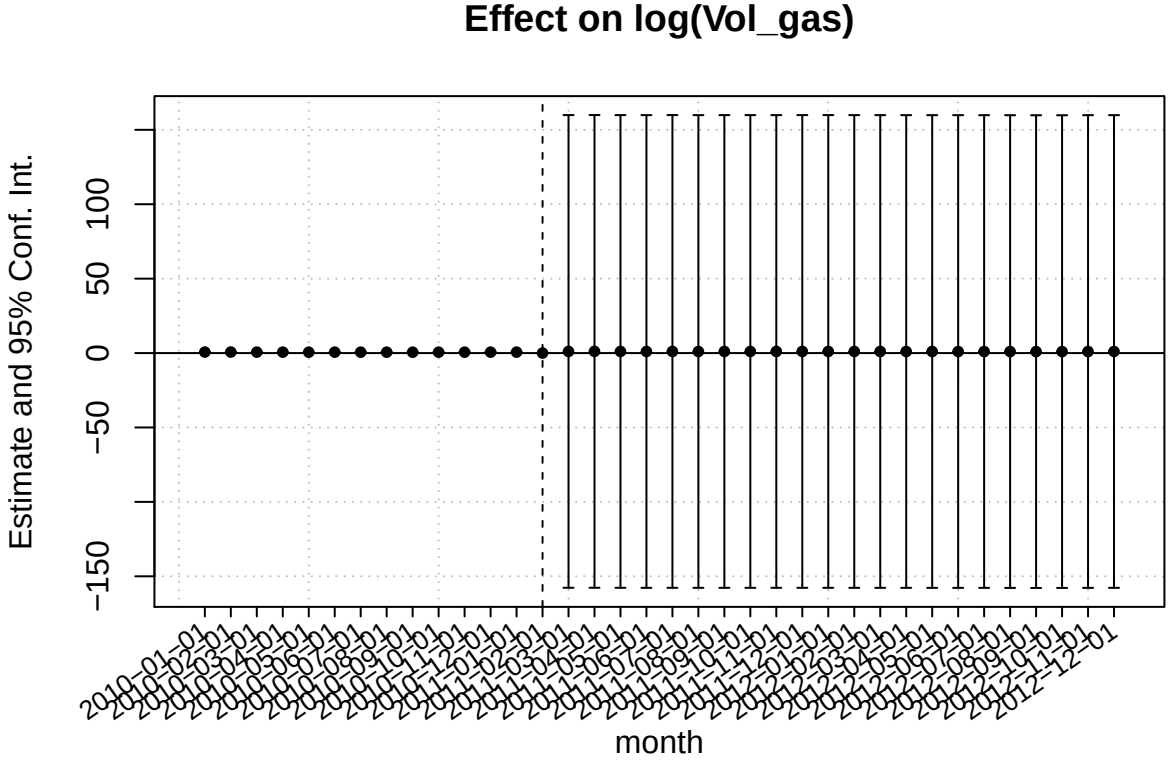

Effect on Vol_tot
Estimate and 95% Conf. Int.
1e+14
0e+00
−1e+14
month

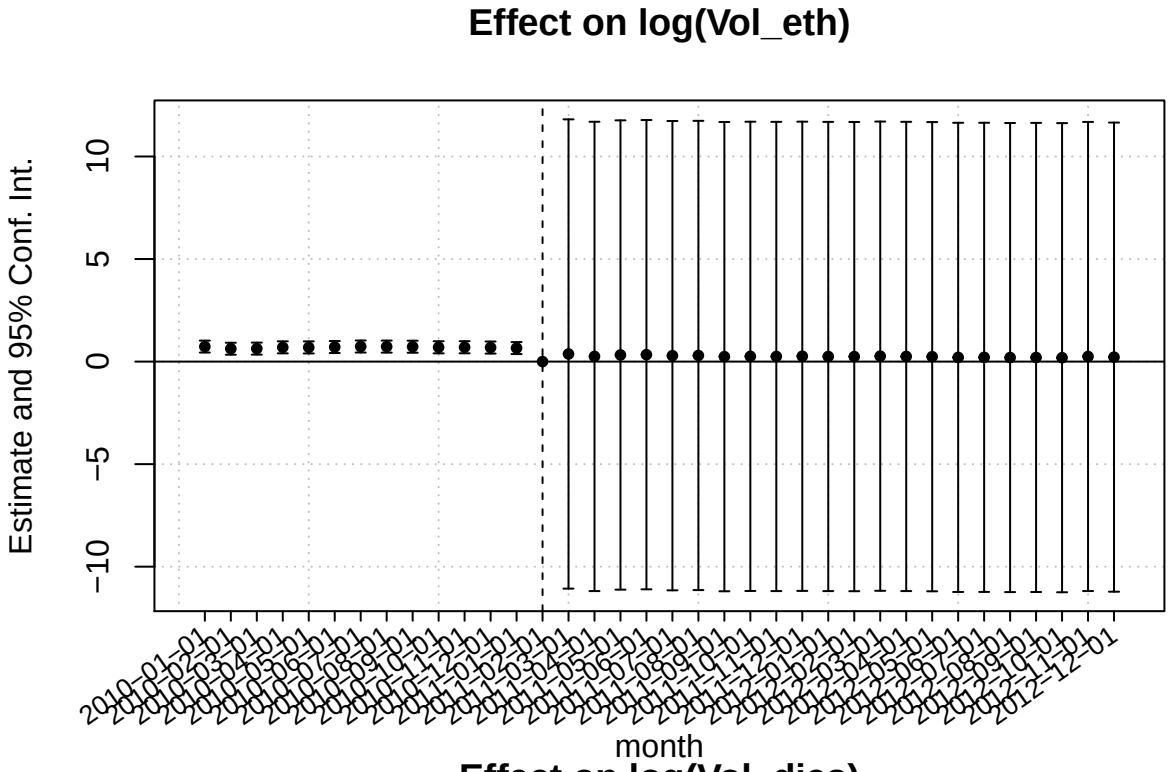

Effect on Vol_gas
Estimate and 95% Conf. Int.
6e+07
2e+07
−2e+07
−6e+07
month

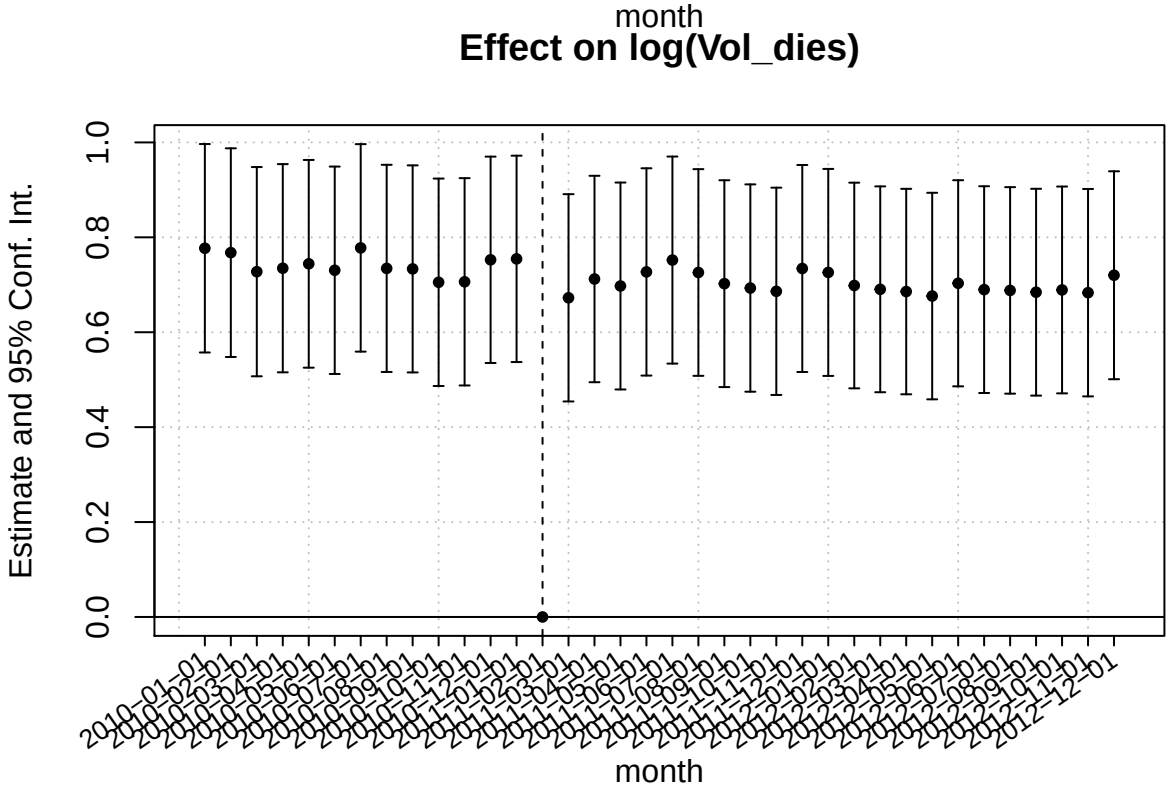

Effect on Vol_eth
Estimate and 95% Conf. Int.
4e+07
0e+00
−4e+07
month

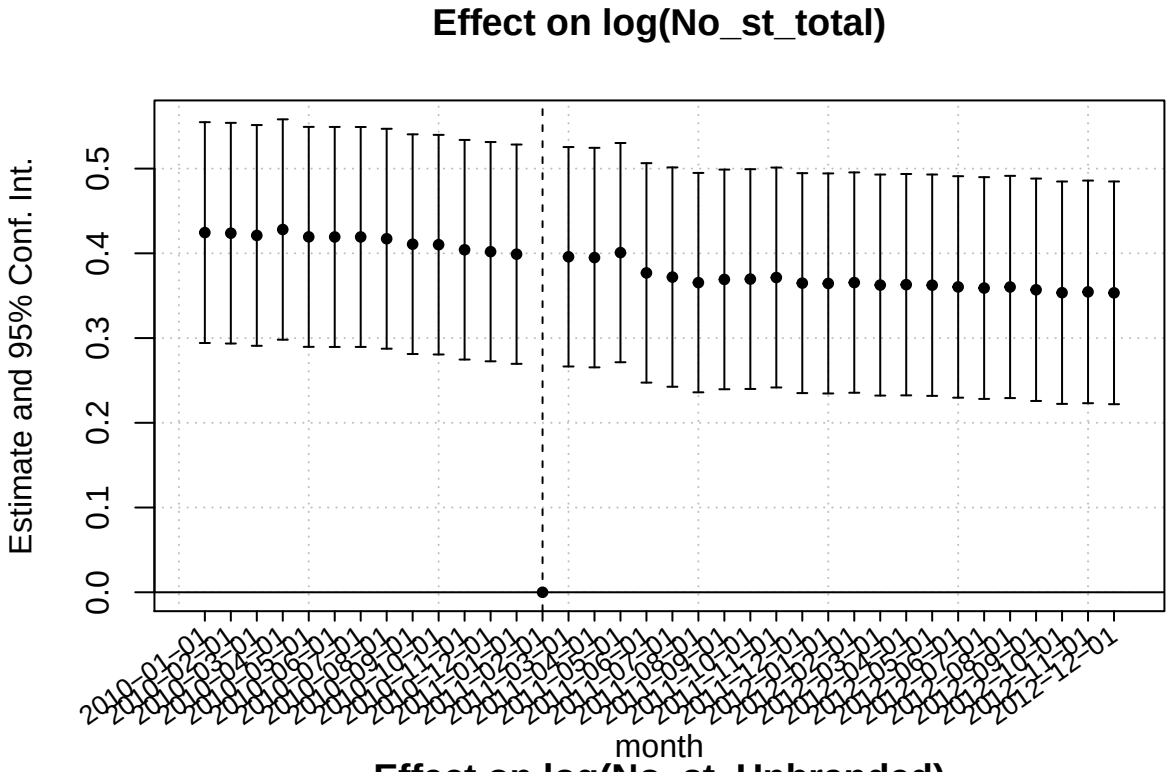

Effect on Vol_dies
Estimate and 95% Conf. Int.
1e+08
0e+00
−1e+08
month

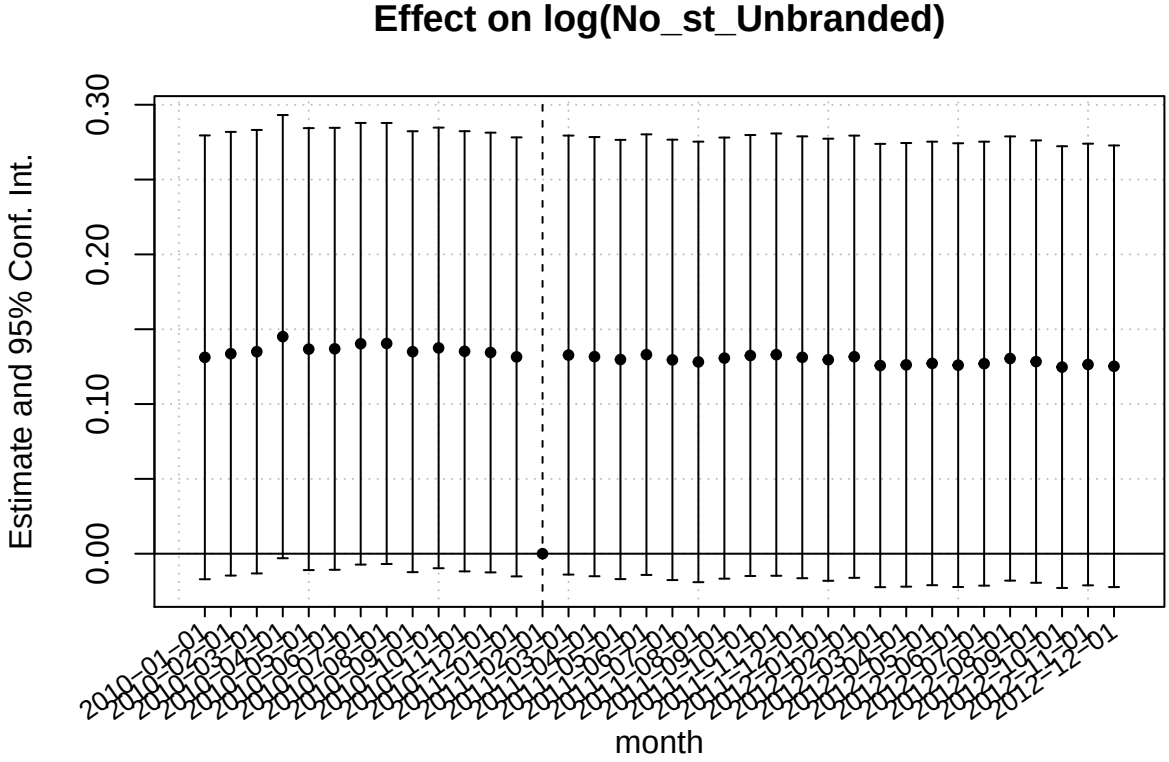

Effect on log(Vol_tot)
Estimate and 95% Conf. Int.
30
20
10
0
−10
−30
month


Effect on log(Vol_gas)
Estimate and 95% Conf. Int.
100
50
0
−50
−150
month


Effect on log(Vol_eth)
Estimate and 95% Conf. Int.
10
5
0
−5
−10
month


Effect on log(Vol_dies)
Estimate and 95% Conf. Int.
1.0
0.8
0.6
0.4
0.2
0.0
month


Effect on log(No_st_total)
Estimate and 95% Conf. Int.
0.0
0.1
0.2
0.3
0.4
0.5
month


Effect on log(No_st_Unbranded)
Estimate and 95% Conf. Int.
0.00
0.10
0.20
0.30
month