Quantile ARDL

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Contents

Loading data

Generating lags

Stats

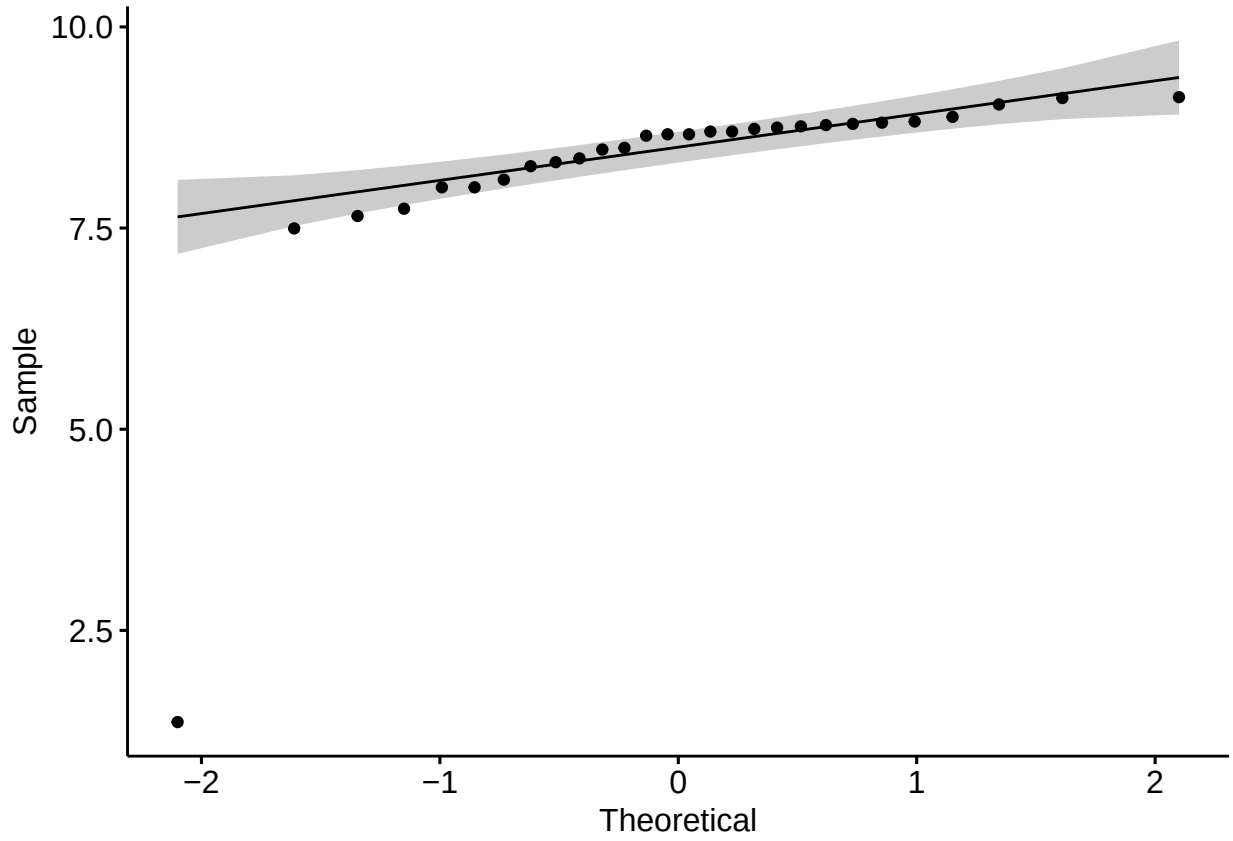
Table 1: Table continues below

	gdpo	lap	kap	epa	sizo	topo
nbr.val	29	29	29	29	29	29
nbr.null	0	0	0	0	0	0
nbr.na	0	0	0	0	0	0
min	3.9	11.26	1.052	3.39	0.7122	0.3542
max	9200	24.34	3.25	5.889	2.516	0.7418
range	9196	13.08	2.198	2.499	1.804	0.3875
sum	152904	413	66.66	127.6	45.71	15.4
median	5800	14.06	2.408	4.238	1.463	0.5475
mean	5273	14.24	2.299	4.399	1.576	0.531
SE.mean	408.9	0.5386	0.09963	0.1076	0.09255	0.01911
CI.mean.0.95	837.5	1.103	0.2041	0.2204	0.1896	0.03915
var	4847744	8.414	0.2879	0.3358	0.2484	0.01059
std.dev	2202	2.901	0.5365	0.5794	0.4984	0.1029
coef.var	0.4176	0.2037	0.2334	0.1317	0.3162	0.1938

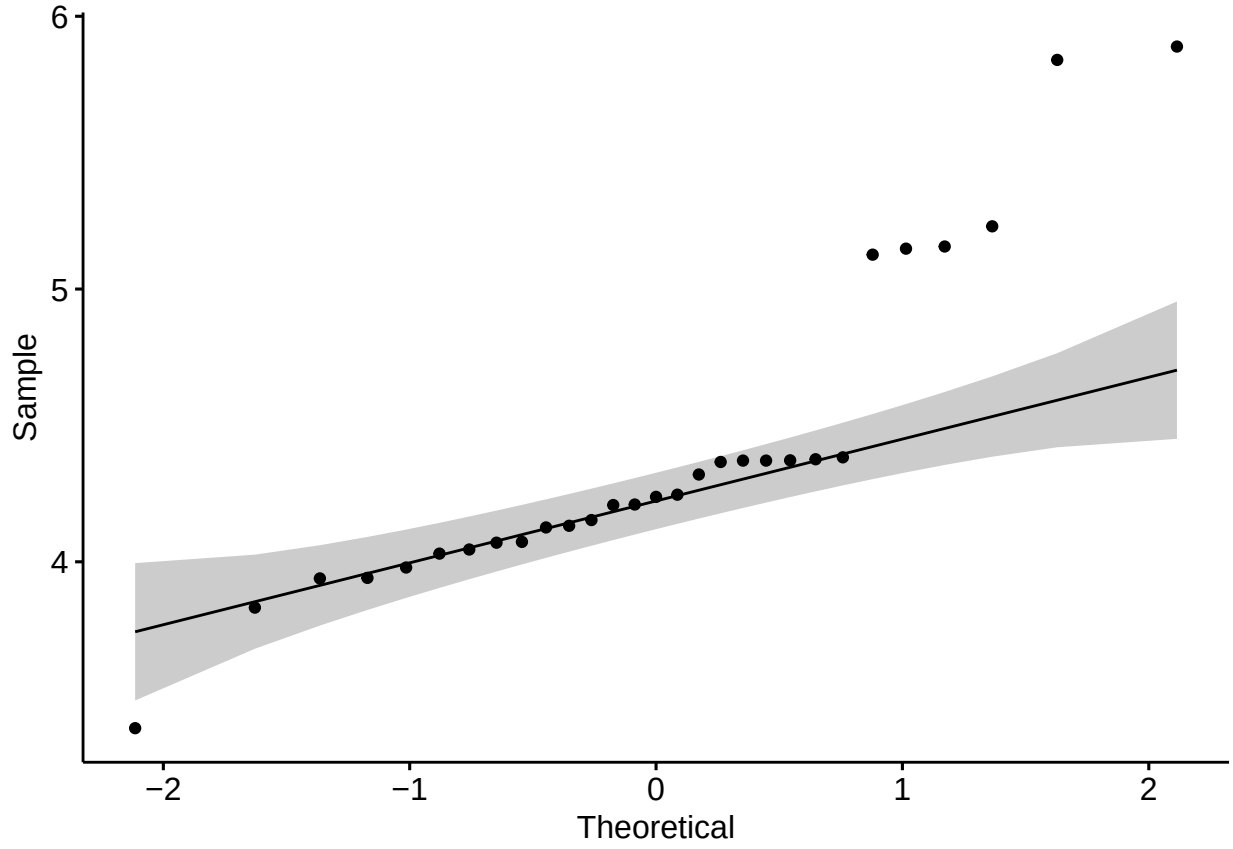
	lgdpo	l.lgdpo	l.epa	l.gdp
nbr.val	29	28	28	28
nbr.null	0	0	0	0
nbr.na	0	1	1	1
min	1.361	1.361	3.39	3.9
max	9.127	9.127	5.889	9200
range	7.766	7.766	2.499	9196
sum	240.1	231.3	123.7	146204
median	8.666	8.666	4.242	5800

	lgdpo	l.lgdpo	l.epa	l.gdp
mean	8.279	8.26	4.419	5222
SE.mean	0.2594	0.2681	0.1095	420.4
CI.mean.0.95	0.5313	0.55	0.2247	862.6
var	1.951	2.012	0.3359	4949127
std.dev	1.397	1.418	0.5796	2225
coef.var	0.1687	0.1717	0.1312	0.4261

Qqplot



Qqplot 2



Test

Shapiro test

```
    Shapiro-Wilk normality test

data:  df$gdpo
W = 0.96344, p-value = 0.3982
```

Shapiro test 2

```
    Shapiro-Wilk normality test

data:  df$epa
W = 0.84023, p-value = 0.0004818
```

Model

Neat model using jtools

```
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
```

```
  Quantile (tau): 0.05
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.05) = 0.41

Standard errors: Sandwich (Huber)
------------------------------------------------------------
                        Est.   S.E.           t val.      p
----------------- ---------- ------ ---------------- ------
(Intercept)          1767.36   0.00     103959378.24   0.00
l.gdp                  -0.06   0.00    -401536787.22   0.00
lap                  -208.62   0.00    -370914584.30   0.00
kap                  -287.21   0.00    -164921240.92   0.00
l.epa                2059.76   0.00    2738693721.17   0.00
sizo                  257.93   0.00      95212587.16   0.00
topo                -7498.05   0.00   -3857328886.22   0.00
------------------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.1
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.1) = 0.39

Standard errors: Sandwich (Huber)
-----------------------------------------------------------
                        Est.       S.E.   t val.      p
----------------- ---------- ---------- -------- ------
(Intercept)          1767.36   23404.72     0.08   0.94
l.gdp                  -0.06       0.41    -0.14   0.89
lap                  -208.62     605.22    -0.34   0.73
kap                  -287.21    2583.69    -0.11   0.91
l.epa                2059.76    2773.01     0.74   0.47
sizo                  257.93    2782.70     0.09   0.93
topo                -7498.05   19349.23    -0.39   0.70
-----------------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.15
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.15) = 0.37

Standard errors: Sandwich (Huber)
-----------------------------------------------------
                       Est.      S.E.   t val.      p
----------------- --------- --------- -------- ------
```

(Intercept)	-812.04	8291.58	-0.10	0.92
l.gdp	0.10	0.38	0.25	0.80
lap	-409.43	275.70	-1.49	0.15
kap	-971.96	1802.41	-0.54	0.60
l.epa	2120.48	2859.54	0.74	0.47
sizo	848.94	1209.20	0.70	0.49
topo	2947.73	9820.77	0.30	0.77

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.2
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.2) = 0.36$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-812.04	7421.01	-0.11	0.91
l.gdp	0.10	0.35	0.28	0.78
lap	-409.43	252.83	-1.62	0.12
kap	-971.96	1345.92	-0.72	0.48
l.epa	2120.48	1451.37	1.46	0.16
sizo	848.94	1530.68	0.55	0.59
topo	2947.73	6966.19	0.42	0.68

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.25
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.25) = 0.35$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6921.03	9152.62	-0.76	0.46
l.gdp	0.23	0.43	0.54	0.59
lap	-29.81	315.24	-0.09	0.93
kap	-650.04	1652.92	-0.39	0.70
l.epa	1839.04	1633.77	1.13	0.27
sizo	1180.02	1885.21	0.63	0.54
topo	4271.40	7974.04	0.54	0.60

MODEL INFO:
Observations: 28 (1 missing obs. deleted)

Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.3
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.3) = 0.37$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-7153.15	6792.93	-1.05	0.30
l.gdp	0.33	0.25	1.33	0.20
lap	2.36	285.81	0.01	0.99
kap	362.47	1508.04	0.24	0.81
l.epa	1929.64	685.86	2.81	0.01
sizo	884.55	1723.62	0.51	0.61
topo	-553.22	7316.78	-0.08	0.94

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.35
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.35) = 0.37$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6588.98	7722.95	-0.85	0.40
l.gdp	0.32	0.17	1.85	0.08
lap	-1.43	335.81	-0.00	1.00
kap	303.22	1091.72	0.28	0.78
l.epa	1909.32	540.68	3.53	0.00
sizo	879.38	1315.61	0.67	0.51
topo	-964.99	7292.45	-0.13	0.90

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.4
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.4) = 0.37$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6588.98	7364.70	-0.89	0.38
l.gdp	0.32	0.17	1.94	0.07
lap	-1.43	320.19	-0.00	1.00
kap	303.22	1042.07	0.29	0.77
l.epa	1909.32	516.04	3.70	0.00
sizo	879.38	1255.43	0.70	0.49
topo	-964.99	6956.96	-0.14	0.89

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.45
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.45) = 0.35$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-9198.10	5544.33	-1.66	0.11
l.gdp	0.41	0.17	2.48	0.02
lap	184.67	263.58	0.70	0.49
kap	744.95	1181.01	0.63	0.53
l.epa	1743.13	624.46	2.79	0.01
sizo	1045.86	1163.29	0.90	0.38
topo	-1891.86	6292.22	-0.30	0.77

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.5
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.5) = 0.35$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-8593.39	5471.97	-1.57	0.13
l.gdp	0.42	0.16	2.61	0.02
lap	191.02	258.49	0.74	0.47
kap	756.15	1143.65	0.66	0.52
l.epa	1800.53	601.80	2.99	0.01
sizo	866.26	1121.67	0.77	0.45
topo	-3275.79	6090.85	-0.54	0.60

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.55
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.55) = 0.34$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-8528.86	5484.28	-1.56	0.13
l.gdp	0.42	0.18	2.39	0.03
lap	192.22	219.33	0.88	0.39
kap	732.66	1226.23	0.60	0.56
l.epa	1794.08	672.90	2.67	0.01
sizo	871.61	1250.60	0.70	0.49
topo	-3269.31	6742.54	-0.48	0.63

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.6
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.6) = 0.33$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-8060.48	4937.08	-1.63	0.12
l.gdp	0.39	0.15	2.61	0.02
lap	201.73	193.47	1.04	0.31
kap	403.48	1004.79	0.40	0.69
l.epa	1584.48	658.93	2.40	0.03
sizo	1225.63	1047.47	1.17	0.26
topo	-1734.61	5511.49	-0.31	0.76

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.65
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.65) = 0.33$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6162.90	5183.75	-1.19	0.25
l.gdp	0.37	0.15	2.51	0.02
lap	166.51	204.00	0.82	0.42
kap	232.12	1004.88	0.23	0.82
l.epa	1243.24	676.90	1.84	0.08
sizo	1065.82	1032.96	1.03	0.31
topo	468.05	5575.98	0.08	0.93

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.7
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.7) = 0.33$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6159.64	12661.08	-0.49	0.63
l.gdp	0.37	0.19	2.00	0.06
lap	166.63	481.15	0.35	0.73
kap	228.95	771.30	0.30	0.77
l.epa	1241.40	803.20	1.55	0.14
sizo	1069.49	1726.95	0.62	0.54
topo	481.77	4650.93	0.10	0.92

MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.75
  Method: Barrodale-Roberts

MODEL FIT:
$R^1(0.75) = 0.33$

Standard errors: Sandwich (Huber)

	Est.	S.E.	t val.	p
(Intercept)	-6401.56	3042.68	-2.10	0.05
l.gdp	0.38	0.11	3.50	0.00
lap	159.16	127.23	1.25	0.22
kap	189.39	767.76	0.25	0.81
l.epa	1149.79	607.48	1.89	0.07
sizo	1532.69	751.27	2.04	0.05

```
topo                 1013.45   4865.77     0.21   0.84
-----------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.8
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.8) = 0.35

Standard errors: Sandwich (Huber)
-----------------------------------------------------
                       Est.      S.E.   t val.      p
----------------- ---------- --------- -------- ------
(Intercept)         -8611.68   2381.31    -3.62   0.00
l.gdp                   0.32      0.06     5.06   0.00
lap                    69.81    118.53     0.59   0.56
kap                   199.59    552.55     0.36   0.72
l.epa                1548.17    492.73     3.14   0.00
sizo                 1812.21    371.32     4.88   0.00
topo                 4454.28   3640.59     1.22   0.23
-----------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.85
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.85) = 0.42

Standard errors: Sandwich (Huber)
-----------------------------------------------------
                       Est.       S.E.   t val.      p
----------------- ---------- ---------- -------- ------
(Intercept)         -10557.01   17091.18    -0.62   0.54
l.gdp                   0.45       0.25     1.80   0.09
lap                  -198.54     607.86    -0.33   0.75
kap                  1615.83    1285.06     1.26   0.22
l.epa                2354.14    1283.04     1.83   0.08
sizo                  445.89    2430.11     0.18   0.86
topo                 6213.48    4785.02     1.30   0.21
-----------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.9
  Method: Barrodale-Roberts

MODEL FIT:
```

```
R¹(0.9) = 0.51

Standard errors: Sandwich (Huber)
-------------------------------------------------------
                       Est.       S.E.   t val.      p
----------------- ---------- ---------- -------- ------
(Intercept)         -8776.99   11519.98    -0.76   0.45
l.gdp                  0.41       0.23     1.79   0.09
lap                 -177.30     163.65    -1.08   0.29
kap                 1618.42     697.85     2.32   0.03
l.epa               2118.11    1433.32     1.48   0.15
sizo                 217.68    1080.63     0.20   0.84
topo                5449.51    4545.36     1.20   0.24
-------------------------------------------------------
MODEL INFO:
Observations: 28 (1 missing obs. deleted)
Dependent Variable: gdpo
Type: Quantile regression
  Quantile (tau): 0.95
  Method: Barrodale-Roberts

MODEL FIT:
R¹(0.95) = 0.55

Standard errors: Sandwich (Huber)
-------------------------------------------------------------
                       Est.   S.E.           t val.      p
----------------- ---------- ------ --------------- ------
(Intercept)         -8776.99   0.00   -751414880.31   0.00
l.gdp                  0.41   0.00    497735978.97   0.00
lap                 -177.30   0.00   -377028252.96   0.00
kap                 1618.42   0.00    646983741.89   0.00
l.epa               2118.11   0.00    815100892.53   0.00
sizo                 217.68   0.00     83851046.35   0.00
topo                5449.51   0.00   1444222497.15   0.00
-------------------------------------------------------------
```

Neat model using stargazer

```
Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.05

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept)  1767.36239 11558.50955     0.15291     0.87993
l.gdp          -0.05633     0.33063    -0.17038     0.86634
lap          -208.62270   394.87985    -0.52832     0.60282
kap          -287.20790  2098.07471    -0.13689     0.89242
l.epa        2059.75603  1322.95807     1.55693     0.13443
sizo          257.92914  2514.88885     0.10256     0.91928
topo        -7498.05278 11482.63510    -0.65299     0.52085
```

```
[1] "-"

========================================
               Dependent variable:
             ---------------------------
                         gdpo
----------------------------------------
l.gdp                  -0.056***
                        (0.000)

lap                   -208.623***
                        (0.00000)

kap                   -287.208***
                        (0.00000)

l.epa                2,059.756***
                        (0.00000)

sizo                  257.929***
                        (0.00000)

topo                 -7,498.053***
                        (0.00000)

Constant             1,767.362***
                        (0.00002)

----------------------------------------
Observations              28
========================================
Note:         *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.1

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept)  1767.36239 11027.31724     0.16027     0.87420
l.gdp          -0.05633     0.33604    -0.16763     0.86848
lap          -208.62270   441.05512    -0.47301     0.64109
kap          -287.20790  2043.89744    -0.14052     0.88959
l.epa        2059.75603  1204.25396     1.71040     0.10193
sizo          257.92914  2524.74340     0.10216     0.91960
topo        -7498.05278 11172.01702    -0.67115     0.50944
[1] "-"

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

```
l.gdp                   -0.056
                        (0.409)

lap                     -208.623
                        (605.218)

kap                     -287.208
                       (2,583.688)

l.epa                   2,059.756
                       (2,773.008)

sizo                     257.929
                       (2,782.699)

topo                   -7,498.053
                      (19,349.230)

Constant                1,767.362
                      (23,404.720)

---------------------------------------
Observations              28
=======================================
Note:         *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.15

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept)  -812.04300  9725.89652    -0.08349     0.93425
l.gdp           0.09622     0.28441     0.33831     0.73849
lap          -409.42507   381.76123    -1.07246     0.29568
kap          -971.95816  1958.52722    -0.49627     0.62486
l.epa        2120.47636  1070.97051     1.97996     0.06096
sizo          848.94459  2301.38472     0.36888     0.71591
topo         2947.73009 10655.76007     0.27663     0.78477
[1] "-"

=======================================
                Dependent variable:
             --------------------------
                         gdpo
---------------------------------------
l.gdp                     0.096
                         (0.382)

lap                     -409.425
                        (275.695)

kap                     -971.958
```

```
                    (1,802.413)

l.epa                2,120.476
                    (2,859.537)

sizo                  848.945
                    (1,209.198)

topo                 2,947.730
                    (9,820.774)

Constant             -812.043
                    (8,291.581)

---------------------------------------
Observations            28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.2

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept)  -812.04300 10974.63722    -0.07399     0.94172
l.gdp           0.09622     0.31491     0.30555     0.76296
lap          -409.42507   408.41889    -1.00246     0.32753
kap          -971.95816  1883.43758    -0.51606     0.61121
l.epa        2120.47636  1352.34985     1.56799     0.13183
sizo          848.94459  2336.40692     0.36335     0.71997
topo         2947.73009 10042.85740     0.29352     0.77201
[1] "-"

=======================================
               Dependent variable:
             --------------------------
                        gdpo
---------------------------------------
l.gdp                    0.096
                        (0.346)

lap                     -409.425
                        (252.828)

kap                     -971.958
                    (1,345.915)

l.epa                2,120.476
                    (1,451.366)

sizo                  848.945
                    (1,530.680)
```

```
topo                  2,947.730
                     (6,966.190)

Constant              -812.043
                     (7,421.012)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.25

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6921.03280 10497.12737    -0.65933     0.51685
l.gdp           0.23350     0.30697     0.76068     0.45531
lap           -29.81428   418.37403    -0.07126     0.94386
kap          -650.03794  1699.86667    -0.38241     0.70600
l.epa        1839.04370  1211.72505     1.51771     0.14400
sizo         1180.02408  2246.86183     0.52519     0.60495
topo         4271.39900  9133.62169     0.46766     0.64485
[1] "-"

=======================================
                Dependent variable:
             --------------------------
                         gdpo
---------------------------------------
l.gdp                     0.234
                         (0.429)

lap                      -29.814
                        (315.240)

kap                      -650.038
                       (1,652.915)

l.epa                    1,839.044
                       (1,633.774)

sizo                     1,180.024
                       (1,885.208)

topo                     4,271.399
                       (7,974.044)

Constant               -6,921.033
                       (9,152.623)
```

```
----------------------------------------
Observations             28
========================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.3

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -7153.15408  8013.23434    -0.89267     0.38215
l.gdp           0.32546     0.28258     1.15177     0.26236
lap             2.35997   352.18375     0.00670     0.99472
kap           362.47101  1450.35123     0.24992     0.80508
l.epa        1929.64215   998.65997     1.93223     0.06693
sizo          884.54995  1886.92089     0.46878     0.64406
topo         -553.21545  7772.06006    -0.07118     0.94393
[1] "-"

========================================
                Dependent variable:
             --------------------------
                        gdpo
----------------------------------------
l.gdp                    0.325
                        (0.245)

lap                      2.360
                       (285.806)

kap                    362.471
                     (1,508.039)

l.epa                1,929.642**
                       (685.858)

sizo                   884.550
                     (1,723.621)

topo                  -553.215
                     (7,316.775)

Constant             -7,153.154
                     (6,792.934)

----------------------------------------
Observations             28
========================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)
```

```
tau: [1] 0.35

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6588.97880  8171.21129    -0.80637     0.42907
l.gdp           0.32283     0.27315     1.18190     0.25046
lap            -1.43262   319.95387    -0.00448     0.99647
kap           303.22373  1629.44345     0.18609     0.85416
l.epa        1909.32254   998.58016     1.91204     0.06961
sizo          879.37624  1865.29200     0.47144     0.64219
topo         -964.99279  9784.35333    -0.09863     0.92237
[1] "-"

=======================================
                Dependent variable:
             --------------------------
                         gdpo
---------------------------------------
l.gdp                   0.323*
                        (0.174)

lap                     -1.433
                       (335.813)

kap                     303.224
                      (1,091.721)

l.epa                1,909.323***
                       (540.680)

sizo                    879.376
                      (1,315.610)

topo                   -964.993
                      (7,292.451)

Constant              -6,588.979
                      (7,722.953)

---------------------------------------
Observations              28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.4

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6588.97880  8647.78723    -0.76193     0.45458
l.gdp           0.32283     0.28339     1.13917     0.26746
```

```
lap            -1.43262   350.39232    -0.00409     0.99678
kap           303.22373  1456.51747     0.20818     0.83709
l.epa        1909.32254  1264.64195     1.50977     0.14600
sizo          879.37624  1838.46243     0.47832     0.63736
topo         -964.99279  8460.53994    -0.11406     0.91028
[1] "-"

========================================
                Dependent variable:
             --------------------------
                        gdpo
----------------------------------------
l.gdp                  0.323*
                       (0.166)

lap                    -1.433
                      (320.193)

kap                    303.224
                     (1,042.067)

l.epa                1,909.323***
                       (516.044)

sizo                   879.376
                     (1,255.429)

topo                   -964.993
                     (6,956.959)

Constant              -6,588.979
                     (7,364.704)

----------------------------------------
Observations              28
========================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.45

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -9198.10230  9557.81095    -0.96236     0.34682
l.gdp           0.41005     0.29104     1.40890     0.17350
lap           184.66917   402.08075     0.45928     0.65075
kap           744.95247  1364.26363     0.54605     0.59079
l.epa        1743.13308  1056.53779     1.64985     0.11385
sizo         1045.86159  1874.84578     0.55784     0.58285
topo        -1891.85866  8221.46468    -0.23011     0.82023
[1] "-"
```

```
=======================================
               Dependent variable:
             --------------------------
                        gdpo
---------------------------------------
l.gdp                  0.410**
                       (0.165)

lap                    184.669
                      (263.576)

kap                    744.952
                     (1,181.009)

l.epa                1,743.133**
                      (624.461)

sizo                  1,045.862
                     (1,163.291)

topo                 -1,891.859
                     (6,292.220)

Constant             -9,198.102
                     (5,544.335)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.5

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8593.39289  8190.93881    -1.04913     0.30604
l.gdp           0.42499     0.31128     1.36529     0.18661
lap           191.01971   320.06471     0.59682     0.55701
kap           756.14813  1498.80930     0.50450     0.61916
l.epa        1800.52731   986.96090     1.82431     0.08237
sizo          866.26090  1693.53985     0.51151     0.61433
topo        -3275.78834  9173.91720    -0.35708     0.72460
[1] "-"

=======================================
               Dependent variable:
             --------------------------
                        gdpo
---------------------------------------
l.gdp                  0.425**
                       (0.163)
```

```
lap                    191.020
                      (258.490)

kap                    756.148
                     (1,143.651)

l.epa                1,800.527***
                       (601.799)

sizo                   866.261
                     (1,121.672)

topo                  -3,275.788
                     (6,090.854)

Constant              -8,593.393
                     (5,471.967)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.55

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8528.86360  8291.99836    -1.02857     0.31539
l.gdp           0.42402     0.27604     1.53606     0.13945
lap           192.22129   326.58725     0.58858     0.56242
kap           732.65737  1412.75956     0.51860     0.60946
l.epa        1794.08127  1025.98324     1.74865     0.09496
sizo          871.60563  1601.68167     0.54418     0.59205
topo        -3269.31201  8023.47502    -0.40747     0.68779
[1] "-"

=======================================
                Dependent variable:
             --------------------------
                        gdpo
---------------------------------------
l.gdp                  0.424**
                       (0.177)

lap                    192.221
                      (219.329)

kap                    732.657
                     (1,226.232)
```

```
l.epa                1,794.081**
                      (672.896)

sizo                   871.606
                     (1,250.604)

topo                 -3,269.312
                     (6,742.545)

Constant             -8,528.864
                     (5,484.280)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.6

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8060.48130  8980.81189    -0.89752     0.37962
l.gdp           0.39163     0.26346     1.48646     0.15202
lap           201.73196   368.23314     0.54784     0.58958
kap           403.48299  1420.99636     0.28394     0.77923
l.epa        1584.48227  1011.38986     1.56664     0.13214
sizo         1225.63070  1807.32525     0.67815     0.50508
topo        -1734.61252  8237.71589    -0.21057     0.83525
[1] "-"

=======================================
                Dependent variable:
             ---------------------------
                         gdpo
---------------------------------------
l.gdp                   0.392**
                        (0.150)

lap                     201.732
                       (193.474)

kap                     403.483
                     (1,004.794)

l.epa                1,584.482**
                      (658.926)

sizo                  1,225.631
                     (1,047.465)

topo                 -1,734.613
```

```
                    (5,511.487)

Constant            -8,060.481
                    (4,937.080)

---------------------------------------
Observations            28
=======================================
Note:       *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.65

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6162.89838  8126.66367    -0.75836     0.45667
l.gdp           0.37098     0.25200     1.47217     0.15580
lap           166.50774   327.76887     0.50800     0.61675
kap           232.11897  1412.89291     0.16429     0.87108
l.epa        1243.24251  1084.88035     1.14597     0.26470
sizo         1065.82074  1830.46302     0.58227     0.56659
topo          468.05307  8326.06909     0.05622     0.95570
[1] "-"

=======================================
               Dependent variable:
             ---------------------------
                        gdpo
---------------------------------------
l.gdp                  0.371**
                       (0.148)

lap                    166.508
                      (203.995)

kap                    232.119
                     (1,004.877)

l.epa                1,243.243*
                      (676.901)

sizo                  1,065.821
                     (1,032.959)

topo                   468.053
                     (5,575.984)

Constant            -6,162.898
                    (5,183.749)

---------------------------------------
Observations            28
```

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

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.7

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6159.63921  8117.69581    -0.75879     0.45641
l.gdp           0.37068     0.25075     1.47829     0.15417
lap           166.62973   325.62366     0.51172     0.61418
kap           228.94895  1404.89272     0.16297     0.87210
l.epa        1241.39969  1030.57451     1.20457     0.24177
sizo         1069.49048  1880.25562     0.56880     0.57552
topo          481.77032  7584.35943     0.06352     0.94995
[1] "-"

=======================================
               Dependent variable:
             ---------------------------
                        gdpo
---------------------------------------
l.gdp                  0.371*
                       (0.186)

lap                    166.630
                      (481.153)

kap                    228.949
                      (771.299)

l.epa                 1,241.400
                      (803.198)

sizo                  1,069.490
                     (1,726.946)

topo                   481.770
                     (4,650.935)

Constant             -6,159.639
                    (12,661.080)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.75
```

```
Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -6401.56037  8596.67576    -0.74466     0.46473
l.gdp           0.37817     0.25043     1.51008     0.14592
lap           159.15501   334.90355     0.47523     0.63953
kap           189.38853  1300.83039     0.14559     0.88563
l.epa        1149.78567  1000.77330     1.14890     0.26352
sizo         1532.68744  1795.26268     0.85374     0.40288
topo         1013.44931  6717.35255     0.15087     0.88152
[1] "-"

=======================================
               Dependent variable:
             --------------------------
                        gdpo
---------------------------------------
l.gdp                0.378***
                      (0.108)

lap                   159.155
                     (127.230)

kap                   189.389
                     (767.759)

l.epa               1,149.786*
                      (607.481)

sizo                1,532.687*
                      (751.266)

topo                  1,013.449
                     (4,865.767)

Constant            -6,401.560**
                      (3,042.682)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.8

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8611.67803  9030.13505    -0.95366     0.35111
l.gdp           0.31578     0.25027     1.26180     0.22086
lap            69.80762   342.92076     0.20357     0.84065
kap           199.58879  1369.93944     0.14569     0.88555
```

```
l.epa        1548.17110  1091.40163     1.41852     0.17071
sizo         1812.20803  1720.13696     1.05353     0.30407
topo         4454.27712  7796.10187     0.57135     0.57383
[1] "-"

=======================================
             Dependent variable:
             ---------------------------
                       gdpo
---------------------------------------
l.gdp                0.316***
                      (0.062)

lap                   69.808
                     (118.530)

kap                   199.589
                     (552.547)

l.epa               1,548.171***
                      (492.726)

sizo                1,812.208***
                      (371.318)

topo                  4,454.277
                     (3,640.589)

Constant            -8,611.678***
                     (2,381.310)

---------------------------------------
Observations             28
=======================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.85

Coefficients:
            Value        Std. Error   t value      Pr(>|t|)
(Intercept) -10557.00882  10792.12922     -0.97821      0.33910
l.gdp            0.44930      0.26694      1.68316      0.10715
lap           -198.54104    390.19880     -0.50882      0.61618
kap           1615.82597   1494.15676      1.08143      0.29177
l.epa         2354.14346   1141.52962      2.06227      0.05177
sizo           445.89451   2217.70328      0.20106      0.84259
topo          6213.48165   7627.37276      0.81463      0.42443
[1] "-"

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

```
                          ---------------------------
                                       gdpo
----------------------------------------------------
l.gdp                                 0.449*
                                      (0.250)

lap                                  -198.541
                                     (607.856)

kap                                  1,615.826
                                    (1,285.057)

l.epa                               2,354.143*
                                    (1,283.039)

sizo                                  445.895
                                    (2,430.105)

topo                                 6,213.482
                                    (4,785.024)

Constant                            -10,557.010
                                   (17,091.180)

----------------------------------------------------
Observations                            28
====================================================
Note:                  *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.9

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8776.99040  9854.57013    -0.89065     0.38321
l.gdp           0.40860     0.27515     1.48503     0.15239
lap          -177.30405   352.18124    -0.50345     0.61989
kap          1618.42032  1606.54262     1.00739     0.32521
l.epa        2118.10778  1194.92996     1.77258     0.09081
sizo          217.67750  2093.33449     0.10399     0.91817
topo         5449.51159  8726.45665     0.62448     0.53904
[1] "-"

====================================================
                      Dependent variable:
                          ---------------------------
                                       gdpo
----------------------------------------------------
l.gdp                                 0.409*
                                      (0.228)

lap                                  -177.304
```

```
                      (163.647)

kap                  1,618.420**
                      (697.854)

l.epa                 2,118.108
                     (1,433.317)

sizo                   217.678
                     (1,080.634)

topo                  5,449.512
                     (4,545.364)

Constant             -8,776.990
                    (11,519.980)

----------------------------------------
Observations             28
========================================
Note:        *p<0.1; **p<0.05; ***p<0.01

Call: rq(formula = gdpo ~ l.gdp + lap + kap + l.epa + sizo + topo,
    tau = taus[i], data = df)

tau: [1] 0.95

Coefficients:
            Value       Std. Error  t value     Pr(>|t|)
(Intercept) -8776.99040  9375.53285    -0.93616     0.35983
l.gdp           0.40860     0.30611     1.33482     0.19623
lap          -177.30405   341.56220    -0.51910     0.60912
kap          1618.42032  1591.57548     1.01687     0.32079
l.epa        2118.10778  1182.40379     1.79136     0.08766
sizo          217.67750  2099.30042     0.10369     0.91840
topo         5449.51159  8802.44653     0.61909     0.54252
[1] "-"

========================================
                Dependent variable:
             --------------------------
                        gdpo
----------------------------------------
l.gdp                  0.409***
                        (0.000)

lap                   -177.304***
                       (0.00000)

kap                  1,618.420***
                       (0.00000)

l.epa                2,118.108***
                       (0.00000)
```

```
sizo                    217.678***
                         (0.00000)

topo                  5,449.512***
                         (0.00000)

Constant              -8,776.990***
                         (0.00001)

---------------------------------------
Observations                28
=======================================
Note:          *p<0.1; **p<0.05; ***p<0.01
```

Plot model