

Exports 2019 Q3

Planning and Regional Development

11/19/2019

Three export models.

1. Traditional model

```
## Series: ts(hist$Actual)
## Regression with ARIMA(2,0,1) errors
##
## Coefficients:
##          ar1      ar2      ma1  intercept  WPIIND0.Q.FMFT  WPI06.Q.FMFT
##        -0.1629  0.6016  0.6835  135143.45      106641.79     -35282.71
## s.e.      0.2057  0.1129  0.2203   80594.52      75002.89      57178.09
##      WPI10.Q.FMFT  WPI09.Q.FMFT  JEXCHMTPREAL.Q.FMFT      Q2
##      148256.92      -47491.67      -108382.57  22213.407
## s.e.      44873.69      92949.80      36991.07   4276.798
##          Q3          Q4
##      15891.724  11997.012
## s.e.      3034.794   4334.712
##
## sigma^2 estimated as 210723843:  log likelihood=-995.1
## AIC=2016.2  AICc=2020.93  BIC=2048.85
##
## Training set error measures:
##              ME      RMSE      MAE      MPE      MAPE      MASE
## Training set 209.3422 13525.39 10399.35 -0.1376638 3.499845 0.5745997
##              ACF1
## Training set 0.004418222
```

Tests

2. Autoregressive Model

```
##
## Call:
## arima(x = ts(hist$Actual), order = c(0, 0, 0), xreg = hist_reg, include.mean = T)
##
## Coefficients:
##      intercept  WPIIND0.Q.FMFT  WPI06.Q.FMFT  WPI10.Q.FMFT  WPI09.Q.FMFT
##      34856.33      141625.9      -146457.48      176307.63      74773.18
## s.e.      63069.91      48131.2      34017.58      29515.32      66713.87
##      JEXCHMTPREAL.Q.FMFT      Q2      Q3      Q4
##      -143099.96  21438.701  15822.233  11257.246
## s.e.      23421.03  4853.611  4856.357  4912.558
##
## sigma^2 estimated as 270784054:  log likelihood = -1012.59,  aic = 2045.18
```

```
##
## Training set error measures:
##           ME RMSE MAE MPE MAPE
## Training set NaN  NaN NaN NaN  NaN
```

Tests

3. Variable Selection

```
## Series: ts(before$Actual)
## Regression with ARIMA(1,0,2) errors
##
## Coefficients:
##          ar1          ma1          ma2  before.GDP..G8.Q.FGBA1
##          -0.5734  0.9128  0.4303                      0.2811
## s.e.       0.2879  0.2770  0.0961                      3.4456
##          before.GCRE.WEHM.Q.FGBA1  before.WPI06.Q.FMFT
##                               113.8654                31666.91
## s.e.                        29.9654                43598.88
##          before.CR.NP.WEHM.Q.FGBA1  before.WPI10.Q.FMFT  before.WPI09.Q.FMFT
##                               4.6051                120460.27                -170505.63
## s.e.                        3.5478                28846.05                62025.07
##          before.JEXCHMTPREAL.Q.FMFT  before.WPIINDO.Q.FMFT  before.Q2
##                               -103994.55                31074.83  21246.788
## s.e.                        34931.82                54269.38  3899.715
##          before.Q3  before.Q4
##          15225.743  11027.162
## s.e.      3392.514  3932.442
##
## sigma^2 estimated as 175439543:  log likelihood=-974.51
## AIC=1979.01  AICc=1985.5  BIC=2016.51
##
## Training set error measures:
##           ME      RMSE      MAE      MPE      MAPE      MASE
## Training set -39.84681 12171.65 9779.008 -0.2022184 3.282956 0.5440066
##           ACF1
## Training set 0.01915411
```

Tests

```
## [1] 1.944146
## $pred
## Time Series:
## Start = 91
## End = 163
## Frequency = 1
## [1] 370747.5 365057.8 396139.0 389229.5 388530.8 377526.9 399656.0
## [8] 394625.0 392025.0 383694.1 407487.2 404510.4 402613.3 393718.0
## [15] 417149.3 413639.9 412143.2 404214.4 428532.1 425011.2 423008.8
## [22] 414326.5 438202.8 434949.0 433307.6 424577.6 447625.1 443614.3
## [29] 441422.4 431950.5 454556.5 450067.3 447738.2 438510.8 460942.0
```

```

## [36] 456263.5 453110.3 443276.2 465330.4 460345.1 457218.4 447611.0
## [43] 470472.4 464995.3 461566.2 451571.9 473437.1 468359.2 465208.8
## [50] 455258.0 477355.9 472436.0 469290.3 459272.0 481122.7 475886.7
## [57] 472690.7 462527.5 484367.1 479217.8 475938.9 465656.6 487134.7
## [64] 481732.6 478273.5 468141.2 489819.7 484528.5 480985.4 470696.0
## [71] 492394.6 487017.7 483447.9
##
## $se
## Time Series:
## Start = 91
## End = 163
## Frequency = 1
## [1] 13245.36 13987.67 14331.79 14443.13 14479.55 14491.50 14495.43
## [8] 14496.72 14497.14 14497.28 14497.33 14497.34 14497.35 14497.35
## [15] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [22] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [29] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [36] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [43] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [50] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [57] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [64] 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35 14497.35
## [71] 14497.35 14497.35 14497.35
##
## $quarter
## [1] "2019-07-01" "2019-10-01" "2020-01-01" "2020-04-01" "2020-07-01"
## [6] "2020-10-01" "2021-01-01" "2021-04-01" "2021-07-01" "2021-10-01"
## [11] "2022-01-01" "2022-04-01" "2022-07-01" "2022-10-01" "2023-01-01"
## [16] "2023-04-01" "2023-07-01" "2023-10-01" "2024-01-01" "2024-04-01"
## [21] "2024-07-01" "2024-10-01" "2025-01-01" "2025-04-01" "2025-07-01"
## [26] "2025-10-01" "2026-01-01" "2026-04-01" "2026-07-01" "2026-10-01"
## [31] "2027-01-01" "2027-04-01" "2027-07-01" "2027-10-01" "2028-01-01"
## [36] "2028-04-01" "2028-07-01" "2028-10-01" "2029-01-01" "2029-04-01"
## [41] "2029-07-01" "2029-10-01" "2030-01-01" "2030-04-01" "2030-07-01"
## [46] "2030-10-01" "2031-01-01" "2031-04-01" "2031-07-01" "2031-10-01"
## [51] "2032-01-01" "2032-04-01" "2032-07-01" "2032-10-01" "2033-01-01"
## [56] "2033-04-01" "2033-07-01" "2033-10-01" "2034-01-01" "2034-04-01"
## [61] "2034-07-01" "2034-10-01" "2035-01-01" "2035-04-01" "2035-07-01"
## [66] "2035-10-01" "2036-01-01" "2036-04-01" "2036-07-01" "2036-10-01"
## [71] "2037-01-01" "2037-04-01" "2037-07-01" "2037-10-01"
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## Call:
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```
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```

Comparison