Reggression

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## R Markdown

RMasterData <- read.csv(file = "C:/Users/Kristopher/odrive/Google Drive/Water Transfer Project/Modified\_Data\_Models/MasterData\_regression.csv", header = TRUE)

## des stats varaibles

sum(RMasterData$AgtoAg)

## [1] 194

sum(RMasterData$AgtoEnivo)

## [1] 55

sum(RMasterData$AgtoUrban)

## [1] 918

sum(RMasterData$UrbantoAg)

## [1] 8

sum(RMasterData$UrbantoEnviro)

## [1] 4

sum(RMasterData$UrbantoUrban)

## [1] 173

sum(RMasterData$EnvirotoAg)

## [1] 0

sum(RMasterData$EnvirotoUrban)

## [1] 0

sum(RMasterData$EnvirotoEnviro)

## [1] 0

mean(RMasterData$InflationAdjustedPricePerAnnualAcreFoot ~ RMasterData$Month)

## Apr Dec Feb Jan Jul/Aug Jun Mar May   
## 5725.081 5695.962 3514.886 4121.064 4376.149 4316.234 4708.172 4073.052   
## Nov Oct Sep   
## 5853.312 4116.168 4857.508

mean(RMasterData$InflationAdjustedPricePerAnnualAcreFoot ~ RMasterData$State)

## AZ CA CO ID MT NM   
## 1066.27442 13523.20804 5337.05774 88.33752 1857.68115 1857.77670   
## NV OR TX UT WA WY   
## 3895.10832 139.70462 501.92270 936.15086 412.56849 984.48142

sd(RMasterData$InflationAdjustedPricePerAnnualAcreFoot ~ RMasterData$Month)

## Apr Dec Feb Jan Jul/Aug Jun Mar   
## 13868.488 16210.671 3490.557 4009.759 4232.555 3936.363 4059.085   
## May Nov Oct Sep   
## 4468.807 14220.484 4414.535 5001.787

sd(RMasterData$InflationAdjustedPricePerAnnualAcreFoot ~ RMasterData$State)

## AZ CA CO ID MT NM   
## 1537.05798 39257.45230 4188.52017 63.13781 2485.42214 1660.43811   
## NV OR TX UT WA WY   
## 5068.30221 121.96956 430.60430 830.06278 360.61872 706.85770

## Regression

reg1 <- lm(log(InflationAdjustedPricePerAnnualAcreFoot) ~ CommitedAverageAcreFeet + AgtoUrban + AgtoEnivo + UrbantoAg + UrbantoEnviro + UrbantoUrban + PDSI + Jan + Feb + Mar + Apr + May + Jun + Jul.Aug + Oct + Nov + Dec + AZ + CA + ID + MT + NM + NV + OR + TX + UT + WA + WY, data = RMasterData)  
summary(reg1)

##   
## Call:  
## lm(formula = log(InflationAdjustedPricePerAnnualAcreFoot) ~ CommitedAverageAcreFeet +   
## AgtoUrban + AgtoEnivo + UrbantoAg + UrbantoEnviro + UrbantoUrban +   
## PDSI + Jan + Feb + Mar + Apr + May + Jun + Jul.Aug + Oct +   
## Nov + Dec + AZ + CA + ID + MT + NM + NV + OR + TX + UT +   
## WA + WY, data = RMasterData)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -8.4541 -0.7309 0.2068 0.6828 5.0169   
##   
## Coefficients:  
## Estimate Std. Error t value  
## (Intercept) 7.4986370990 0.1269649999 59.061  
## CommitedAverageAcreFeet -0.0000005975 0.0000001618 -3.694  
## AgtoUrban 0.8063913141 0.0879233104 9.172  
## AgtoEnivo 0.4619170543 0.2004144361 2.305  
## UrbantoAg -1.4036677448 0.4182811344 -3.356  
## UrbantoEnviro -1.0781724046 0.5750076540 -1.875  
## UrbantoUrban 0.7829190605 0.1328809010 5.892  
## PDSI -0.0826498114 0.0116341493 -7.104  
## Jan 0.0350634855 0.1368791852 0.256  
## Feb -0.2168111508 0.1396977955 -1.552  
## Mar 0.1140494472 0.1411523939 0.808  
## Apr -0.0221053424 0.1479865754 -0.149  
## May -0.2916400439 0.1403093330 -2.079  
## Jun -0.0036492188 0.1407654324 -0.026  
## Jul.Aug -0.1710711994 0.1302917141 -1.313  
## Oct -0.1188866302 0.1457533968 -0.816  
## Nov -0.0448149099 0.1568899682 -0.286  
## Dec 0.0112232836 0.1634002652 0.069  
## AZ -1.9299361614 0.1480431727 -13.036  
## CA -1.0396934217 0.1995254233 -5.211  
## ID -3.0478740168 0.2908998269 -10.477  
## MT -1.8257399967 0.7837475802 -2.330  
## NM -0.8245331889 0.1570949244 -5.249  
## NV -0.4838810037 0.1428390644 -3.388  
## OR -3.6801176625 0.3732466996 -9.860  
## TX -2.1219913211 0.1668141970 -12.721  
## UT -1.7059835689 0.1738227206 -9.815  
## WA -2.2171711004 0.3455922656 -6.416  
## WY -1.4775559803 0.5587590931 -2.644  
## Pr(>|t|)   
## (Intercept) < 0.0000000000000002 \*\*\*  
## CommitedAverageAcreFeet 0.000230 \*\*\*  
## AgtoUrban < 0.0000000000000002 \*\*\*  
## AgtoEnivo 0.021331 \*   
## UrbantoAg 0.000814 \*\*\*  
## UrbantoEnviro 0.061004 .   
## UrbantoUrban 0.00000000483313 \*\*\*  
## PDSI 0.00000000000197 \*\*\*  
## Jan 0.797864   
## Feb 0.120900   
## Mar 0.419242   
## Apr 0.881281   
## May 0.037850 \*   
## Jun 0.979322   
## Jul.Aug 0.189414   
## Oct 0.414835   
## Nov 0.775194   
## Dec 0.945250   
## AZ < 0.0000000000000002 \*\*\*  
## CA 0.00000021774516 \*\*\*  
## ID < 0.0000000000000002 \*\*\*  
## MT 0.019982 \*   
## NM 0.00000017821798 \*\*\*  
## NV 0.000726 \*\*\*  
## OR < 0.0000000000000002 \*\*\*  
## TX < 0.0000000000000002 \*\*\*  
## UT < 0.0000000000000002 \*\*\*  
## WA 0.00000000019468 \*\*\*  
## WY 0.008281 \*\*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 1.094 on 1328 degrees of freedom  
## Multiple R-squared: 0.4409, Adjusted R-squared: 0.4291   
## F-statistic: 37.4 on 28 and 1328 DF, p-value: < 0.00000000000000022

bptest(reg1)

##   
## studentized Breusch-Pagan test  
##   
## data: reg1  
## BP = 74.903, df = 28, p-value = 0.000003738

vif(reg1)

## CommitedAverageAcreFeet AgtoUrban AgtoEnivo   
## 1.116538 1.917065 1.769919   
## UrbantoAg UrbantoEnviro UrbantoUrban   
## 1.161877 1.101100 2.225587   
## PDSI Jan Feb   
## 1.065025 2.050686 1.954941   
## Mar Apr May   
## 1.955627 1.817826 1.958866   
## Jun Jul.Aug Oct   
## 1.958283 2.275229 1.837629   
## Nov Dec AZ   
## 1.655602 1.599521 1.553723   
## CA ID MT   
## 1.101937 1.186212 1.024338   
## NM NV OR   
## 1.068523 1.297631 1.269262   
## TX UT WA   
## 1.097467 1.026856 1.088146   
## WY   
## 1.039749

resettest(reg1)

##   
## RESET test  
##   
## data: reg1  
## RESET = 10.694, df1 = 2, df2 = 1326, p-value = 0.00002471

dwtest(reg1)

##   
## Durbin-Watson test  
##   
## data: reg1  
## DW = 1.2663, p-value < 0.00000000000000022  
## alternative hypothesis: true autocorrelation is greater than 0

reg2 <- coeftest(reg1, vcov. = vcovHC(reg1, "HC1"))  
reg2

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value  
## (Intercept) 7.49863709900 0.13676270259 54.8295  
## CommitedAverageAcreFeet -0.00000059746 0.00000023611 -2.5304  
## AgtoUrban 0.80639131406 0.10213865727 7.8951  
## AgtoEnivo 0.46191705434 0.25178947978 1.8345  
## UrbantoAg -1.40366774480 0.59252270636 -2.3690  
## UrbantoEnviro -1.07817240464 0.70920374196 -1.5203  
## UrbantoUrban 0.78291906054 0.20650537072 3.7913  
## PDSI -0.08264981140 0.01146700194 -7.2076  
## Jan 0.03506348551 0.13650683267 0.2569  
## Feb -0.21681115080 0.13623064932 -1.5915  
## Mar 0.11404944715 0.12820355985 0.8896  
## Apr -0.02210534238 0.13942700673 -0.1585  
## May -0.29164004388 0.14917255795 -1.9551  
## Jun -0.00364921879 0.13289982887 -0.0275  
## Jul.Aug -0.17107119944 0.14143491574 -1.2095  
## Oct -0.11888663018 0.13708138033 -0.8673  
## Nov -0.04481490994 0.15415106055 -0.2907  
## Dec 0.01122328356 0.15701554374 0.0715  
## AZ -1.92993616143 0.28862732336 -6.6866  
## CA -1.03969342165 0.35089636371 -2.9630  
## ID -3.04787401675 0.27262865302 -11.1796  
## MT -1.82573999673 1.30790922807 -1.3959  
## NM -0.82453318887 0.13300901854 -6.1991  
## NV -0.48388100373 0.14083522814 -3.4358  
## OR -3.68011766248 0.45377818217 -8.1099  
## TX -2.12199132107 0.13879739262 -15.2884  
## UT -1.70598356890 0.17465391030 -9.7678  
## WA -2.21717110036 0.23157300000 -9.5744  
## WY -1.47755598030 0.35610479767 -4.1492  
## Pr(>|t|)   
## (Intercept) < 0.00000000000000022 \*\*\*  
## CommitedAverageAcreFeet 0.0115065 \*   
## AgtoUrban 0.000000000000006034 \*\*\*  
## AgtoEnivo 0.0667980 .   
## UrbantoAg 0.0179802 \*   
## UrbantoEnviro 0.1286843   
## UrbantoUrban 0.0001566 \*\*\*  
## PDSI 0.000000000000952172 \*\*\*  
## Jan 0.7973247   
## Feb 0.1117350   
## Mar 0.3738437   
## Apr 0.8740521   
## May 0.0507865 .   
## Jun 0.9780982   
## Jul.Aug 0.2266707   
## Oct 0.3859505   
## Nov 0.7713103   
## Dec 0.9430275   
## AZ 0.000000000033550330 \*\*\*  
## CA 0.0031012 \*\*   
## ID < 0.00000000000000022 \*\*\*  
## MT 0.1629711   
## NM 0.000000000756647386 \*\*\*  
## NV 0.0006091 \*\*\*  
## OR 0.000000000000001141 \*\*\*  
## TX < 0.00000000000000022 \*\*\*  
## UT < 0.00000000000000022 \*\*\*  
## WA < 0.00000000000000022 \*\*\*  
## WY 0.000035482298255705 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1