

```
*****
* create a log file
*****

log using "D:\Jason\workshop\multiple imputation\2022\code2.log", replace

*****
* Change the working directory
*****

cd "D:\Jason\workshop\multiple imputation\2022"

*****
* Use a Stata data file with an arbitrary missing-data pattern (p.220 of Stata Manual)
*****
use https://www.stata-press.com/data/r17/mhouses1993, clear

*****
* Examine the patterns of missing variables in the data
*****

misstable pattern
misstable sum, all
misstable nested

*****
* Normalize the highly skewed variables with missing values
*****

sktest age tax
generate lnage = ln(age)
generate lntax = ln(tax)
sktest lnage lntax

*****
*Specify the data format and variable types
*****
mi set mlong
mi register imputed lnage lntax
mi register regular price sqft nfeatures ne custom corner
mi register passive tax age
mi describe

save "example1.dta", replace

*****
* Imputation using Multiple Imputation by Chained Equations (MICE)
*****

*****
*read in the data
*****
use "example1.dta", clear

*****
* Impute the data
*****
mi impute chained (regress) lnage lntax = price sqft nfeatures ne custom corner, add(20) rseed(23)
* mi impute chained (regress) lnage (pmm,knn(3))lntax = price sqft nfeatures ne custom corner, add(20) rseed(23)

tab1 age tax if _mi_m ==0, mis
by _mi_m: sum age tax lnage lntax if _mi_m ~=0

*****
* save the data
*****
save "mice.dta", replace

*****
*** Analysis using imputed data sets
*****
```

```
use mice.dta, clear
```

```
*****
```

```
* Conduct Regression Analysis
```

```
*****
```

```
quietly mi passive: replace age = exp(lnage)
```

```
quietly mi passive: replace tax = exp(lntax)
```

```
mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
```

```
*****
```

```
* Post-estimation test
```

```
*****
```

```
*****
```

```
* Test if both age and tax both are significantly different from zero
```

```
*****
```

```
mi test age tax
```

```
*****
```

```
* Test if both the coefficients of AGE and TAX are equal
```

```
*****
```

```
mi estimate (diff: _b[age]- _b[tax]): regress price sqft age nfeatures ne custom corner tax
```

```
mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
```

```
mi estimate (diff: _b[age]- _b[tax]) using mice_result.dta
```

```
*****
```

```
* Test if the coefficients of AGE, TAX, and NE are equal
```

```
*****
```

```
mi estimate (diff1: _b[age]- _b[tax]) (diff2: _b[age]- _b[ne]) using mice_result.dta
```

```
mi testtransform diff1 diff2
```

```
*****
```

```
* Test if the ratio of coefficients of AGE and TAX
```

```
*****
```

```
mi estimate (ratio: _b[age]/_b[tax]) using mice_result.dta
```

```
*****
```

```
*****
```

```
* Imputation using multivariate normal model (MVN)
```

```
*****
```

```
*****
```

```
*read in the data
```

```
*****
```

```
use "example1.dta", clear
```

```
*****
```

```
* Impute the data
```

```
*****
```

```
mi impute mvn lnage lntax = price sqft nfeatures ne custom corner, add(20) rseed(23)
```

```
tab1 age tax if _mi_m ==0, mis
```

```
by _mi_m: sum age tax lnage lntax if _mi_m ~ =0
```

```
*****
```

```
* save the data
```

```
*****
```

```
save "mvn.dta", replace
```

```
*****
```

```
* Estimating the model
```

```
*****
```

```
*** Analysis *****
```

```
use mvn.dta, clear
```

```
*****
```

```
* Conduct Regression Analysis
```

```
*****
quietly mi passive: replace age = exp(lnage)
quietly mi passive: replace tax = exp(lntax)

mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax

*****
* Post-estimation test
*****

*****
* Test if both age and tax both are significantly different from zero
*****
mi test age tax

*****
* Test if both the coefficients of AGE and TAX are equal
*****
mi estimate (diff: _b[age]- _b[tax]): regress price sqft age nfeatures ne custom corner tax

mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
mi estimate (diff: _b[age]- _b[tax]) using mice_result.dta

*****
* Test if the coefficients of AGE, TAX, and NE are equal
*****

mi estimate (diff1: _b[age]- _b[tax]) (diff2: _b[age]- _b[ne]) using mice_result.dta
mi testtransform diff1 diff2

*****
* Test if the ratio of coefficients of AGE and TAX differs from zero
*****
mi estimate (ratio: _b[age]/_b[tax]) using mice_result.dta

log close
```