

```

1 *****
2
3 * create a log file
4 *****
5
6 log using "C:\Drive_D\Jason\workshop\multiple imputation\2024\codes_2024.log", replace
7
8
9 *****
10 * Change the working directory
11 *****
12
13 cd "C:\Drive_D\Jason\workshop\multiple imputation\2024"
14
15
16
17 *****
18 * Use a Stata data file with an arbitrary missing-data pattern (p.220 of Stata Manual)
19 *****
20 use https://www.stata-press.com/data/r17/mhouses1993, clear
21
22
23 *****
24 * Examine the patterns of missing variables in the data
25 *****
26
27 misstable pattern
28 misstable sum, all
29 misstable nested
30
31
32 *****
33 * Normalize the highly skewed variables with missing values
34 *****
35
36 sktest age tax
37 generate lnage = ln(age)
38 generate lntax = ln(tax)
39 sktest lnage lntax
40
41 *****
42 *Specify the data format and varaible types
43 *****
44 mi set mlong
45 mi register imputed lnage lntax
46 mi register regular price sqft nfeatures ne custom corner
47 mi register passive tax age
48 mi describe
49
50
51 save "example1.dta", replace
52
53
54 *****
55 * Imputation using Multiple Imputation by Chained Equations (MICE)
56 *****
57
58 *****
59 *read in the data
60 *****
61 use "example1.dta", clear
62
63
64 *****
65 * Impute the data
66 *****
67 mi impute chained (regress) lnage lntax = price sqft nfeatures ne custom corner, add(20) rseed(23)

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68 *mi impute chained (regress) lnage (pmm,knn(3))lntax = price sqft nfeatures ne custom corner,
add(20) rseed(23)
69
70
71 tab1 age tax if _mi_m ==0, mis
72 by _mi_m: sum age tax lnage lntax if _mi_m ~=0
73
74 *****
75 * save the data
76 *****
77 save "mice.dta", replace
78
79
80
81 *****
82 *** Analysis using imputed data sets
83 *****
84
85 use mice.dta, clear
86
87
88 *****
89 * Conduct Regression Analysis
90 *****
91 quietly mi passive: replace age = exp(lnage)
92 quietly mi passive: replace tax = exp(lntax)
93
94 mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
95
96
97 *****
98 * Post-estimation test
99 *****
100
101 *****
102 * Test if both age and tax both are significantly different from zero
103 *****
104 mi test age tax
105
106 *****
107 * Test if both the coefficients of AGE and TAX are equal
108 *****
109 mi estimate (diff: _b[age]- _b[tax]): regress price sqft age nfeatures ne custom corner tax
110
111 mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
112 mi estimate (diff: _b[age]- _b[tax]) using mice_result.dta
113
114
115
116 *****
117 * Test if the coefficients of AGE, TAX, and NE are equal
118 *****
119
120 mi estimate (diff1: _b[age]- _b[tax]) (diff2: _b[age]- _b[ne]) using mice_result.dta
121 mi testtransform diff1 diff2
122
123 *****
124 * Test if the ratio of coefficients of AGE and TAX
125 *****
126 mi estimate (ratio: _b[age]/_b[tax]) using mice_result.dta
127
128 *****
129
130
131
132
133 *****

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134 * Imputation using multivariate normal model (MVN)
135 *****
136
137 *****
138 *read in the data
139 *****
140
141 use "example1.dta", clear
142
143
144 *****
145 * Impute the data
146 *****
147
148 mi impute mvn lnage lntax = price sqft nfeatures ne custom corner, add(20) rseed(23)
149 tab1 age tax if _mi_m ==0, mis
150 by _mi_m: sum age tax lnage lntax if _mi_m ~=0
151
152
153 *****
154 * save the data
155 *****
156 save "mvn.dta", replace
157
158
159 *****
160 * Estimating the model
161 *****
162
163 *** Analysis *****
164
165 use mvn.dta, clear
166
167 *****
168 * Conduct Regression Analysis
169 *****
170 quietly mi passive: replace age = exp(lnage)
171 quietly mi passive: replace tax = exp(lntax)
172
173 mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
174
175
176 *****
177 * Post-estimation test
178 *****
179
180 *****
181 * Test if both age and tax both are significantly different from zero
182 *****
183 mi test age tax
184
185 *****
186 * Test if both the coefficients of AGE and TAX are equal
187 *****
188 mi estimate (diff: _b[age]- _b[tax]): regress price sqft age nfeatures ne custom corner tax
189
190 mi estimate, saving(mice_result.dta, replace): regress price sqft age nfeatures ne custom corner tax
191 mi estimate (diff: _b[age]- _b[tax]) using mice_result.dta
192
193
194
195 *****
196 * Test if the coefficients of AGE, TAX, and NE are equal
197 *****
198
199 mi estimate (diff1: _b[age]- _b[tax]) (diff2: _b[age]- _b[ne]) using mice_result.dta
200 mi testtransform diff1 diff2

```

```
201
202 *****
203 * Test if the ratio of coefficients of AGE and TAX
204 *****
205 mi estimate (ratio: _b[age]/_b[tax]) using mice_result.dta
206
207
208 log close
209
```