FF_SIMU_STATS Examples

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This is the example vignette for function: **ff_simu_stats** from the **MEconTools Package.** This is a gate-way function that computes mean, percentiles, covariance etc between several variables.

Test FF_SIMU_STATS Defaults

Call the function with defaults.

```
ff_simu_stats();
```

```
xxx tb_outcomes: all stats xxx
    OriginalVariableNames     cl_mt_pol_a    cl_mt_pol_c
    _____________________     ___________    ___________

    {'mean'               }     -0.11081         8.8423
    {'sd'                 }       4.1239         6.5845
    {'coefofvar'          }      -37.215        0.74466
    {'min'                }           -7        -6.3772
    {'max'                }            9         21.786
    {'pYis0'              }     0.064259              0
    {'pYls0'              }      0.54867       0.027329
    {'pYgr0'              }      0.38707        0.97267
    {'pYisMINY'           }     0.051764       0.015232
    {'pYisMAXY'           }     0.027329       0.046484
    {'p1'                 }           -7        -6.3772
    {'p10'                }           -6        0.27238
    {'p25'                }           -3         5.2138
    {'p50'                }           -1         6.5321
    {'p75'                }            3         13.799
    {'p90'                }            5         16.887
    {'p99'                }            9         21.786
    {'fl_cov_cl_mt_pol_a'}       17.007        -22.084
    {'fl_cor_cl_mt_pol_a'}            1       -0.81327
    {'fl_cov_cl_mt_pol_c'}      -22.084         43.356
    {'fl_cor_cl_mt_pol_c'}     -0.81327              1
    {'fracByP1'           }       3.2699      -0.010985
    {'fracByP10'          }       5.9889      -0.013362
    {'fracByP25'          }       14.165       0.041007
    {'fracByP50'          }       16.208         0.1893
    {'fracByP75'          }       12.702        0.59539
    {'fracByP90'          }       6.6611         0.8307
    {'fracByP99'          }            1              1
```

Test FF_SIMU_STATS Four States-Points Matrix

Over some (a,z) states that is 3 by 3, c matrix, generate all stats

```
% Set Parameters
mt_x_of_s = [1, 2,  3.0;...
             3, 1,  1.5;...
             4, 3,  2.0];
mt_y_of_s = [2, -10, 9.0;...
             5, 1.1,3.0;...
             1, 3,  -1.5];
mt_z_of_s = [1.1, 2,3.3;...
```

```
            2.3, 1,1.5;...
            4, 2.5,2.0];
mp_cl_mt_xyz_of_s = containers.Map('KeyType','char', 'ValueType','any');
mp_cl_mt_xyz_of_s('cl_mt_x_of_s') = {mt_x_of_s, zeros(1)};
mp_cl_mt_xyz_of_s('cl_mt_y_of_s') = {mt_y_of_s, zeros(1)};
mp_cl_mt_xyz_of_s('cl_mt_z_of_s') = {mt_z_of_s, zeros(1)};
mp_cl_mt_xyz_of_s('ar_st_y_name') = ["cl_mt_x_of_s", "cl_mt_y_of_s", "cl_mt_z_of_s"];
% Mass
rng(123);
mt_f_of_s = rand(size(mt_x_of_s));
mt_f_of_s = mt_f_of_s/sum(mt_f_of_s, 'all');
% Call Function
mp_cl_mt_xyz_of_s_out = ff_simu_stats(mt_f_of_s, mp_cl_mt_xyz_of_s);
```

```
xxx tb_outcomes: all stats xxx
     OriginalVariableNames      cl_mt_x_of_s    cl_mt_y_of_s    cl_mt_z_of_s
    ________________________    ____________    ____________    ____________

    {'mean'                }        2.0763          1.9323          2.0668
    {'sd'                  }        0.9071          5.2239          0.9042
    {'coefofvar'           }       0.43688          2.7034         0.43749
    {'min'                 }             1             -10               1
    {'max'                 }             4               9               4
    {'pYis0'               }             0               0               0
    {'pYls0'               }             0         0.20441               0
    {'pYgr0'               }             1         0.79559               1
    {'pYisMINY'            }       0.28039         0.10917         0.14247
    {'pYisMAXY'            }      0.044922         0.19422        0.044922
    {'p1'                  }             1             -10               1
    {'p10'                 }             1             -10               1
    {'p25'                 }             1             1.1             1.1
    {'p50'                 }             2               2               2
    {'p75'                 }             3               5             2.5
    {'p90'                 }             3               9             3.3
    {'p99'                 }             4               9               4
    {'fl_cov_cl_mt_x_of_s'}       0.82282           1.589         0.78646
    {'fl_cor_cl_mt_x_of_s'}             1         0.33534         0.95887
    {'fl_cov_cl_mt_y_of_s'}         1.589          27.289          1.8353
    {'fl_cor_cl_mt_y_of_s'}       0.33534               1         0.38856
    {'fl_cov_cl_mt_z_of_s'}       0.78646          1.8353         0.81758
    {'fl_cor_cl_mt_z_of_s'}       0.95887         0.38856               1
    {'fracByP1'            }       0.13504        -0.56498        0.068934
    {'fracByP10'           }       0.13504        -0.56498        0.068934
    {'fracByP25'           }       0.13504        -0.53456         0.14234
    {'fracByP50'           }       0.42991        -0.39181         0.43856
    {'fracByP75'           }       0.91346        0.095425         0.60296
    {'fracByP90'           }       0.91346               1         0.91306
    {'fracByP99'           }             1               1               1
```

Test FF_SIMU_STATS Four States-Points Matrix Single Column Inputs

Same as before, but now inputs are single column, should have identical results:

```
% Array Inputs
mp_cl_ar_xyz_of_s = containers.Map('KeyType','char', 'ValueType','any');
mp_cl_mt_xyz_of_s('cl_mt_x_of_s') = {mt_x_of_s(:), zeros(1)};
mp_cl_mt_xyz_of_s('cl_mt_y_of_s') = {mt_y_of_s(:), zeros(1)};
mp_cl_mt_xyz_of_s('cl_mt_z_of_s') = {mt_z_of_s(:), zeros(1)};
mp_cl_mt_xyz_of_s('ar_st_y_name') = ["cl_mt_x_of_s", "cl_mt_y_of_s", "cl_mt_z_of_s"];
```

```
% Call Function
mp_cl_mt_xyz_of_s_out = ff_simu_stats(mt_f_of_s(:), mp_cl_mt_xyz_of_s);
```

```
xxx tb_outcomes: all stats xxx
     OriginalVariableNames     cl_mt_x_of_s    cl_mt_y_of_s    cl_mt_z_of_s
    ________________________   ____________    ____________    ____________

    {'mean'                }        2.0763          1.9323          2.0668
    {'sd'                  }        0.9071          5.2239          0.9042
    {'coefofvar'           }       0.43688          2.7034         0.43749
    {'min'                 }             1             -10               1
    {'max'                 }             4               9               4
    {'pYis0'               }             0               0               0
    {'pYls0'               }             0         0.20441               0
    {'pYgr0'               }             1         0.79559               1
    {'pYisMINY'            }       0.28039         0.10917         0.14247
    {'pYisMAXY'            }      0.044922         0.19422        0.044922
    {'p1'                  }             1             -10               1
    {'p10'                 }             1             -10               1
    {'p25'                 }             1             1.1             1.1
    {'p50'                 }             2               2               2
    {'p75'                 }             3               5             2.5
    {'p90'                 }             3               9             3.3
    {'p99'                 }             4               9               4
    {'fl_cov_cl_mt_x_of_s'}        0.82282           1.589         0.78646
    {'fl_cor_cl_mt_x_of_s'}              1         0.33534         0.95887
    {'fl_cov_cl_mt_y_of_s'}          1.589          27.289          1.8353
    {'fl_cor_cl_mt_y_of_s'}        0.33534               1         0.38856
    {'fl_cov_cl_mt_z_of_s'}        0.78646          1.8353         0.81758
    {'fl_cor_cl_mt_z_of_s'}        0.95887         0.38856               1
    {'fracByP1'            }        0.13504        -0.56498        0.068934
    {'fracByP10'           }        0.13504        -0.56498        0.068934
    {'fracByP25'           }        0.13504        -0.53456         0.14234
    {'fracByP50'           }        0.42991        -0.39181         0.43856
    {'fracByP75'           }        0.91346        0.095425         0.60296
    {'fracByP90'           }        0.91346               1         0.91306
    {'fracByP99'           }              1               1               1
```

Test FF_SIMU_STATS Print Many Details

The Same As before, but now control which percentiles and other details to display.

```
% Array Inputs
mp_cl_ar_xyz_of_s = containers.Map('KeyType','char', 'ValueType','any');
mp_cl_ar_xyz_of_s('cl_ar_x_of_s') = {mt_x_of_s(:), zeros(1)};
mp_cl_ar_xyz_of_s('cl_ar_z_of_s') = {mt_z_of_s(:), zeros(1)};
mp_cl_ar_xyz_of_s('ar_st_y_name') = ["cl_ar_x_of_s", "cl_ar_z_of_s"];

% controls
mp_support = containers.Map('KeyType','char', 'ValueType','any');
mp_support('bl_display_detail') = false;
mp_support('bl_display_final') = true;
mp_support('bl_display_drvm2outcomes') = false;
mp_support('ar_fl_percentiles') = [25 50 75];
mp_support('bl_display_drvstats') = true;
mp_support('bl_display_drvm2covcor') = false;

% Call Function
mp_cl_mt_xyz_of_s_out = ff_simu_stats(mt_f_of_s(:), mp_cl_ar_xyz_of_s, mp_support);
```

---
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Summary Statistics for: cl_ar_x_of_s
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
---
fl_choice_mean
    2.0763

fl_choice_sd
    0.9071

fl_choice_coefofvar
    0.4369

fl_choice_prob_zero
     0

fl_choice_prob_below_zero
     0

fl_choice_prob_above_zero
     1

fl_choice_prob_max
    0.0449

tb_disc_cumu

cl_ar_x_of_sDiscreteVal	cl_ar_x_of_sDiscreteValProbMass	CDF	cumsumFrac
1	0.28039	28.039	0.13504
1.5	0.13561	41.6	0.23301
2	0.20441	62.041	0.42991
3	0.33466	95.508	0.91346
4	0.044922	100	1

cl_ar_x_of_sDiscreteVal	cl_ar_x_of_sDiscreteValProbMass	CDF	cumsumFrac
1	0.28039	28.039	0.13504
1.5	0.13561	41.6	0.23301
2	0.20441	62.041	0.42991
3	0.33466	95.508	0.91346
4	0.044922	100	1

tb_prob_drv

percentiles	cl_ar_x_of_sDiscreteValPercentileValues	fracOfSumHeldBelowThisPercentile
25	1	0.13504
50	2	0.42991
75	3	0.91346

---
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Summary Statistics for: cl_ar_z_of_s
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
---
fl_choice_mean
    2.0668

fl_choice_sd
    0.9042

fl_choice_coefofvar
    0.4375

fl_choice_prob_zero
     0

fl_choice_prob_below_zero
     0

fl_choice_prob_above_zero
     1

fl_choice_prob_max
    0.0449

tb_disc_cumu

cl_ar_z_of_sDiscreteVal	cl_ar_z_of_sDiscreteValProbMass	CDF	cumsumFrac
1	0.14247	14.247	0.068934
1.1	0.13792	28.039	0.14234
1.5	0.13561	41.6	0.24076
2	0.20441	62.041	0.43856
2.3	0.056663	67.708	0.50162
2.5	0.083786	76.086	0.60296
3.3	0.19422	95.508	0.91306
4	0.044922	100	1

cl_ar_z_of_sDiscreteVal	cl_ar_z_of_sDiscreteValProbMass	CDF	cumsumFrac
1	0.14247	14.247	0.068934
1.1	0.13792	28.039	0.14234
1.5	0.13561	41.6	0.24076
2	0.20441	62.041	0.43856
2.3	0.056663	67.708	0.50162
2.5	0.083786	76.086	0.60296
3.3	0.19422	95.508	0.91306
4	0.044922	100	1

tb_prob_drv

percentiles	cl_ar_z_of_sDiscreteValPercentileValues	fracOfSumHeldBelowThisPercentile
25	1.1	0.14234
50	2	0.43856
75	2.5	0.60296

xxx tb_outcomes: all stats xxx

OriginalVariableNames	cl_ar_x_of_s	cl_ar_z_of_s
{'mean' }	2.0763	2.0668
{'sd' }	0.9071	0.9042
{'coefofvar' }	0.43688	0.43749
{'min' }	1	1
{'max' }	4	4
{'pYis0' }	0	0
{'pYls0' }	0	0
{'pYgr0' }	1	1
{'pYisMINY' }	0.28039	0.14247
{'pYisMAXY' }	0.044922	0.044922
{'p25' }	1	1.1
{'p50' }	2	2
{'p75' }	3	2.5

{'fl_cov_cl_ar_x_of_s'}	0.82282	0.78646
{'fl_cor_cl_ar_x_of_s'}	1	0.95887
{'fl_cov_cl_ar_z_of_s'}	0.78646	0.81758
{'fl_cor_cl_ar_z_of_s'}	0.95887	1
{'fracByP25' }	0.13504	0.14234
{'fracByP50' }	0.42991	0.43856
{'fracByP75' }	0.91346	0.60296