

mode quiet

```
%startdate = "1999q4"  
%endsmpl = "2045q4"  
%enddate = "2023q4" '##### fin observations trim  
%startsim0m1 = "2021" '##### année fin observations et debut fancharts - 2
```

```
%startsim0 = "2023" '##### année fin observations et debut fancharts  
%startsim1 = "2024" '##### année début projection  
%endsim = "2028q4" '##### fin projections trim  
%endadjust = "2028" '##### fin période d'ajustement  
%endeval = "2033" '##### five years after %endadjust
```

```
cd "C:\Users\le-mateumen\Documents\ATMJ\EC_SDSA"
```

```
%wf0="data_es_eurostat_1999q1_2024q4"
```

```
wfopen %wf0
```

```
%pays = "es"
```

```
WFCREATE(wf=data_trimmed_mat_yoy_{%startdate}_{%enddate}_{%pays},page=quarterly_{%pays}) q %startdate %endsmpl  
smpl %startdate %enddate
```

```
copy(c=na) %wf0::source\soldep_p_{%pays}  
copy(c=na) %wf0::source\stn_3m_{%pays}  
copy(c=na) %wf0::source\ltn_10y_{%pays}  
copy(c=na) %wf0::source\g_v_yoy_{%pays}  
copy(c=na) %wf0::source\maturity_{%pays}
```

```
wfclose %wf0
```

'1) Winsorize the series as the EC does : 5 and 95 pct quantiles since 1999q4

```
%groups="soldep_p stn_3m ltn_10y g_v_yoy"  
for %var {%groups}  
  scalar q95_{%var} = @quantile({%var}_{%pays},0.95)  
  scalar q5_{%var} = @quantile({%var}_{%pays},0.05)  
  series {%var}_trimmed = {%var}_{%pays}*@between({%var}_{%pays},q5_{%var},q95_{%var})+ q5_{%var}*({%var}_{%pays}< q5_{%var}) + q95_{%var}*({%var}_{%pays}> q95_{%var})  
next
```

```
series stn_3m_trimmed = stn_3m_trimmed/100  
series ltn_10y_trimmed = ltn_10y_trimmed/100
```

'2) Built the "historical shocks" and compute their covariance matrix

```
for %var {%groups}  
  series shock_hist_{%var} = d({%var}_trimmed)  
next
```

```
smpl %startdate+1 %enddate 'starting in 2000Q1
```

```
group shock_hist shock_hist_soldep_p shock_hist_stn_3m shock_hist_ltn_10y shock_hist_g_v_yoy  
stom(shock_hist,shock_hist_m)  
sym cov = @covs(shock_hist_m) 'd.o.f. corrected
```

'3) 10,000 random draws

```
smpl %enddate+1 %endsim  
series eps_soldep_p  
series eps_stn_3m  
series eps_ltn_10y  
series eps_g_v_yoy  
group g_eps eps_soldep_p eps_stn_3m eps_ltn_10y eps_g_v_yoy
```

```
scalar nsim=1000  
scalar w =20 ' 5-year projections
```

```
for %var {%groups}  
  matrix(nsim,5) ann_{%var} 'matrices for 4 shocks annualized + tx_moy
```

```

next
matrix(nsim,5) ann_ratio 'matrices for 4 shocks annualized + tx_moy

```

```

rndseed 123456
lj=1
while lj<=nsim
  rndseed 123456+{lj}'
  matrix epsn = @rmvnorm(cov,w)
  mtos(epsn,g_eps)

```

#### '4) Annualize the shocks

```

for %var {%groups}
series acc_eps_{%var} = @cumsum(eps_{%var})
stom(acc_eps_{%var},acc_{%var})
  li=1 'first year shocks initialization
  matrix ann_{%var}(lj,li) = acc_{%var}(1,4*li)
  matrix ann_ltn_10y(lj,li) = acc_{%var}(1,4*li)*li/maturity_{%pays}

  li=2
  while li<=5
    matrix ann_{%var}(lj,li) = acc_{%var}(1,4*li) - acc_{%var}(1,4*(li-1)) 'keeps the 4 quarters of year li only
    matrix ann_ltn_10y(lj,li) = acc_{%var}(1,4*li)*li/maturity_{%pays} 'ltn_10y's special treatment: shocks cumulate over 5 years

    li = li+1
  wend
next
lj=lj+1
wend

```

#### '5) copy the shocks' matrices in an annual page

```

pagecreate(page=annual_{%pays}) a %startsim0m1 %endsmpl

```

```

  copy quarterly_{%pays}\ann_soldep_p
  copy quarterly_{%pays}\ann_stn_3m
  copy quarterly_{%pays}\ann_ltn_10y
  copy quarterly_{%pays}\ann_g_v_yoy
  copy quarterly_{%pays}\nsim
wfoopen %wf0

wfselct data_trimmed_mat_yoy_{%startdate}_{%enddate}_{%pays}_
pageselct annual_{%pays}
  copy %wf0::annual\mal_p_bkcom_000_{%pays} dette_bkcom_000_{%pays}
  copy %wf0::annual\dda_bkcom_000_{%pays} * 'source : https://economy-finance.ec.europa.eu/economic-and-fiscal-governance/stability-and-growth-pact
  copy %wf0::annual\g_v_yoy_bkcom_000_{%pays} *
  copy %wf0::annual\soldep_p_bkcom_000_{%pays} *
  copy %wf0::annual\ltn_10y_bkcom_000_{%pays} *
  copy %wf0::annual\stn_3m_bkcom_000_{%pays} *
  copy %wf0::annual\iir_bkcom_000_{%pays} tx_moy_bkcom_000_{%pays}
  copy %wf0::annual\alphact_{%pays} *
  copy %wf0::annual\alphalt_{%pays} *

wfclose %wf0

```

'on opère des ajustements sur les variables pour garder la cohérence des ordres de grandeurs pour tous les scénarios

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```

series dette_iir_bkcom_000_{%pays} = dette_bkcom_000_{%pays}/100
series soldep_p_bkcom_000_{%pays} = soldep_p_bkcom_000_{%pays}/100
series g_v_yoy_bkcom_000_{%pays} = g_v_yoy_bkcom_000_{%pays}/100
series ltn_10y_bkcom_000_{%pays} = ltn_10y_bkcom_000_{%pays}/100
series stn_3m_bkcom_000_{%pays} = stn_3m_bkcom_000_{%pays}/100
series tx_moy_bkcom_000_{%pays} = tx_moy_bkcom_000_{%pays}/100

```

```

smpl %enddate %enddate
scalar dettem1 = dette_iir_bkcom_000_{%pays}

```

```

smpl %startsim0 %endsim

```

'group for baseline trajectories

```
group g_base soldep_p_bkcom_000_{%pays} stn_3m_bkcom_000_{%pays} ltn_10y_bkcom_000_{%pays} g_v_yoy_bkcom_000_{%pays} tx_moy_bkcom_000_{%pays}
stom(g_base,base_m)
```

%groups2 = "soldep\_p stn\_3m ltn\_10y g\_v\_yoy tx\_moy dette\_iir "

```
for %var {%groups2}
    matrix(nsim,5) sim_{%var} 'matrices for shocked baseline
next
```

lj=1

while lj<=nsim

lk=1 'projection year

while lk<=5

sim\_soldep\_p(lj,lk) = base\_m(lk,1)+ann\_soldep\_p(lj,lk)

sim\_stn\_3m(lj,lk) = base\_m(lk,2)+ann\_stn\_3m(lj,lk)

sim\_ltn\_10y(lj,lk) = base\_m(lk,3)+ann\_ltn\_10y(lj,lk)

sim\_g\_v\_yoy(lj,lk) = base\_m(lk,4)+ann\_g\_v\_yoy(lj,lk)

sim\_tx\_moy(lj,lk) = (base\_m(lk,5)+alphalt\_{%pays}\*ann\_ltn\_10y(lj,lk)+alphact\_{%pays}\*ann\_stn\_3m(lj,lk))\*(base\_m(lk,5)+alphalt\_{%pays}\*ann\_ltn\_10y(lj,lk)+alphact\_{%pays}\*ann\_stn\_3m(lj,lk)>0) 'positivity constraint

lk=lk+1

wend

lj=lj+1

wend

' debt ratio and prob computation

lj=1

while lj<=nsim

sim\_dette\_iir(lj,1)=dettem1\*((1+sim\_tx\_moy(lj,1))/(1+sim\_g\_v\_yoy(lj,1))) -sim\_soldep\_p(lj,1)

lk=2 'projection year

while lk<=5

sim\_dette\_iir(lj,lk)=sim\_dette\_iir(lj,lk-1)\*((1+sim\_tx\_moy(lj,lk))/(1+sim\_g\_v\_yoy(lj,lk))) -sim\_soldep\_p(lj,lk)

lk=lk+1

wend

lj=lj+1

wend

for %var {%groups2}

vector q5\_{%var} = @cquantile(sim\_{%var}, .05)

vector q10\_{%var} = @cquantile(sim\_{%var}, .1)

vector q20\_{%var} = @cquantile(sim\_{%var}, .2)

vector q30\_{%var} = @cquantile(sim\_{%var}, .3)

vector q40\_{%var} = @cquantile(sim\_{%var}, .4)

vector med\_{%var} = @cquantile(sim\_{%var}, .5)

vector q60\_{%var} = @cquantile(sim\_{%var}, .6)

vector q70\_{%var} = @cquantile(sim\_{%var}, .7)

vector q80\_{%var} = @cquantile(sim\_{%var}, .8)

vector q90\_{%var} = @cquantile(sim\_{%var}, .9)

vector q95\_{%var} = @cquantile(sim\_{%var}, .95)

next

%vector="q95 q5 q90 q10 q80 q20 q70 q30 q60 q40 med"

smpl %startsim0+1 %endsim

for %var {%groups2}

for %vec {%vector}

mtos({%vec}\_{%var}, {%vec}s\_{%var}\_s)

next

next

smpl %startsim0 %startsim0

for %var {%groups2}

for %vec {%vector}

series {%vec}s\_{%var}\_s = {%var}\_bkcom\_000\_{%pays}

series dette\_iir\_bkcom\_000\_{%pays} = dette\_iir\_bkcom\_000\_{%pays}

next

next

smpl %startsim0 %endsim

for %var {%groups2}

group g\_fan\_chart\_{%var}\_{%pays} q95s\_{%var}\_s q5s\_{%var}\_s q90s\_{%var}\_s q10s\_{%var}\_s q80s\_{%var}\_s q20s\_{%var}\_s q70s\_{%var}\_s q30s\_{%var}\_s q60s\_{%var}\_s q40s\_{%var}\_s meds\_{%var}\_s {%var}\_bkcom\_000\_{%pays}

```

freeze(fan_boot_{%var}_{%pays} ) g_fan_chart_{%var}_{%pays}.mixed band(1,2,3,4,5,6,7,8,9,10) line(11,12)
fan_boot_{%var}_{%pays}.legend columns(2)
fan_boot_{%var}_{%pays}.setelem(1) fillcolor(@rgb(185,185,255))
fan_boot_{%var}_{%pays}.setelem(2) fillcolor(@rgb(136,136,255))
fan_boot_{%var}_{%pays}.setelem(3) fillcolor(@rgb(66,66,255))
fan_boot_{%var}_{%pays}.setelem(4) fillcolor(@rgb(33,33,255))
fan_boot_{%var}_{%pays}.setelem(4) fillcolor(@rgb(20,20,255))
fan_boot_{%var}_{%pays}.setelem(1) lcolor(black) 'médiane
fan_boot_{%var}_{%pays}.setelem(2) lcolor(red) '
fan_boot_{%var}_{%pays}.setelem(11) legend("Median")
fan_boot_{%var}_{%pays}.setelem(12) legend({%var} bkcom)
next

```