

The French INFORUM model: latest progress

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Recent work of the French model

- Update of the existing database (43 sectors)
 - IO tables and accounts 1970-2008
 - National accounts 1970-2009 (except investments, capital stock and depreciation from 1978)
 - Institutional accounts 1970-2009
- Building of an *accountant*
- Introducing the accountant in the IO model

The institutional accounts

- Data are detailed for 5 institutions:
 - households (including family businesses)
 - non-financial enterprises
 - financial enterprises
 - public administration
 - rest of the world
- According to ESA95, INSEE produces 8 accounts:
 - Production account
 - Generation of income account
 - Allocation of primary income account
 - Secondary distribution of income account
 - Use of income account
 - Capital account
 - Redistribution of income in kind account
 - Use of adjusted disposable income account

Two possible uses of these macrovariables by institutions (Almon, 1995)

- 1) A *master* file for a free-standing macromodel has been built based upon linkages between time-series macrovariables (consumption, investments, exports, imports, ...) and *behavioural* ratios by institutions. Ratios are the new exogenous variables – more stable and easier to forecast – .

From the master file of a macromodel

```
# INVESTMENT (FBCF=formation brute capital fixe)
#
# exogenous in real terms from national accounts
fex FBCFk=investftotk # from the NA bank
#
# a macroequation for investments could be inserted here
#
# convert from real to nominal
f FBCFt=FBCFk*inv_P*gdp_defl # from the NA
#
# compute exogenous ratios for dividing investments
# among institutions
fex fbcfEm_r=mbcfE/FBCFt
fex fbcfEsf_r=sffbcfE/FBCFt
fex fbcfEap_r=apfbcfE/FBCFt
#
# compute investments by institution
# making non-financial firms as residual
f mbcfE=fbcfEm_r*FBCFt
f sffbcfE=fbcfEsf_r*FBCFt
f apfbcfE=fbcfEap_r*FBCFt
f snffbcfE=FBCFt-mbcfE-sffbcfE-apfbcfE
#
```

2) The second use is to build an accountant for the IO model. The *accountant* is the part of an Inforum model which converts income by industry to income of various institutions. Therefore institutional accounts from 3 to 6 are mainly used.

- Allocation of primary income account
- Secondary distribution of income account
- Use of income account
- Capital account

This part of the model allows us to compute some variables which are used in the equations (such as disposable income) and other important variables for decision making.

A smaller file (*account.sav*) has been prepared to be introduced into the master file of the French Interdyme model to link the IO variables with the institutional variables.

In this file around 200 macrovariables (by institutions) and *behavioural ratios* are computed. These are filled to the model as exogenous variables through the master file. In the *model.cpp* file the *account* function is called after all IO variables used in the accountant have been computed (some are left exogenous as macrovariables and listed in *pseudo.sav*).

From *account.sav*: example (1)

```
#
# WAGES RECEIVED BY INSTITUTIONAL SECTORS
fex sbEm_r=msbE/mPIB
fex sbEisbl_r=isblsbE/isblPIB
fex sbEsf_r=sfsbE/sfPIB
fex sbEsnf_r=snfsbE/snfPIB
fex sbEap_r=apsbE/apPIB
fex sbErm_r=rmsbE/imR
#
f msbE=sbEm_r*mPIB
f isblsbE=sbEisbl_r*isblPIB
f sfsbE=sbEsf_r*sfPIB
f snfsbE=sbEsnf_r*snfPIB
f apsbE=sbEap_r*apPIB
f rmsbE=sbErm_r*imR
# TOTAL WAGES RECEIVED BY INSTITUTIONS
f sbT=msbE+isblsbE+sfsbE+snfsbE+apsbE+rmsbE
#
```

Wages are made a behavioural proportion of GDP originating in each institution.

From *account.sav*: example (2)

```
# SOCIAL CONTRIBUTIONS (D121)
fex coeffEm_r=mcoeffE/msbE
fex coeffEisbl_r=isblcoeffE/isblsbE
fex coeffEsf_r=sfcoeffE/sfsbE
fex coeffEsnf_r=snfcoeffE/snfsbE
fex coeffEap_r=apcoeffE/apsbE
fex coeffErm_r=rmcoeffE/rmsbE
#
f mcoeffE=coeffEm_r*msbE
f isblcoeffE=coeffEisbl_r*isblsbE
f sfcoeffE=coeffEsf_r*sfsbE
f snfcoeffE=coeffEsnf_r*snfsbE
f apcoeffE=coeffEap_r*apsbE
f rmcoeffE=coeffErm_r*rmsbE
f coeffT=mcoeffE+isblcoeffE+sfcoeffE+snfcoeffE+apcoeffE+rmcoeffE
#
# PRODUCTION TAXES PAID BY INSTITUTIONS (D29)
fex impotEm_r=mimpotE/mPIB
fex impotEisbl_r=isblimpotE/isblPIB
fex impotEsf_r=sfimpotE/sfPIB
fex impotEsnf_r=snfimpotE/snfPIB
fex impotEap_r=apimpotE/apPIB
#
f mimpotE=impotEm_r*mPIB
f isblimpotE=impotEisbl_r*isblPIB
f sfimpotE=impotEsf_r*sfpib
f snfimpotE=impotEsnf_r*snfPIB
f apimpotE=impotEap_r*apPIB
f impotT=mimpotE+isblimpotE+sfimpotE+snfimpotE+apimpotE
#
```

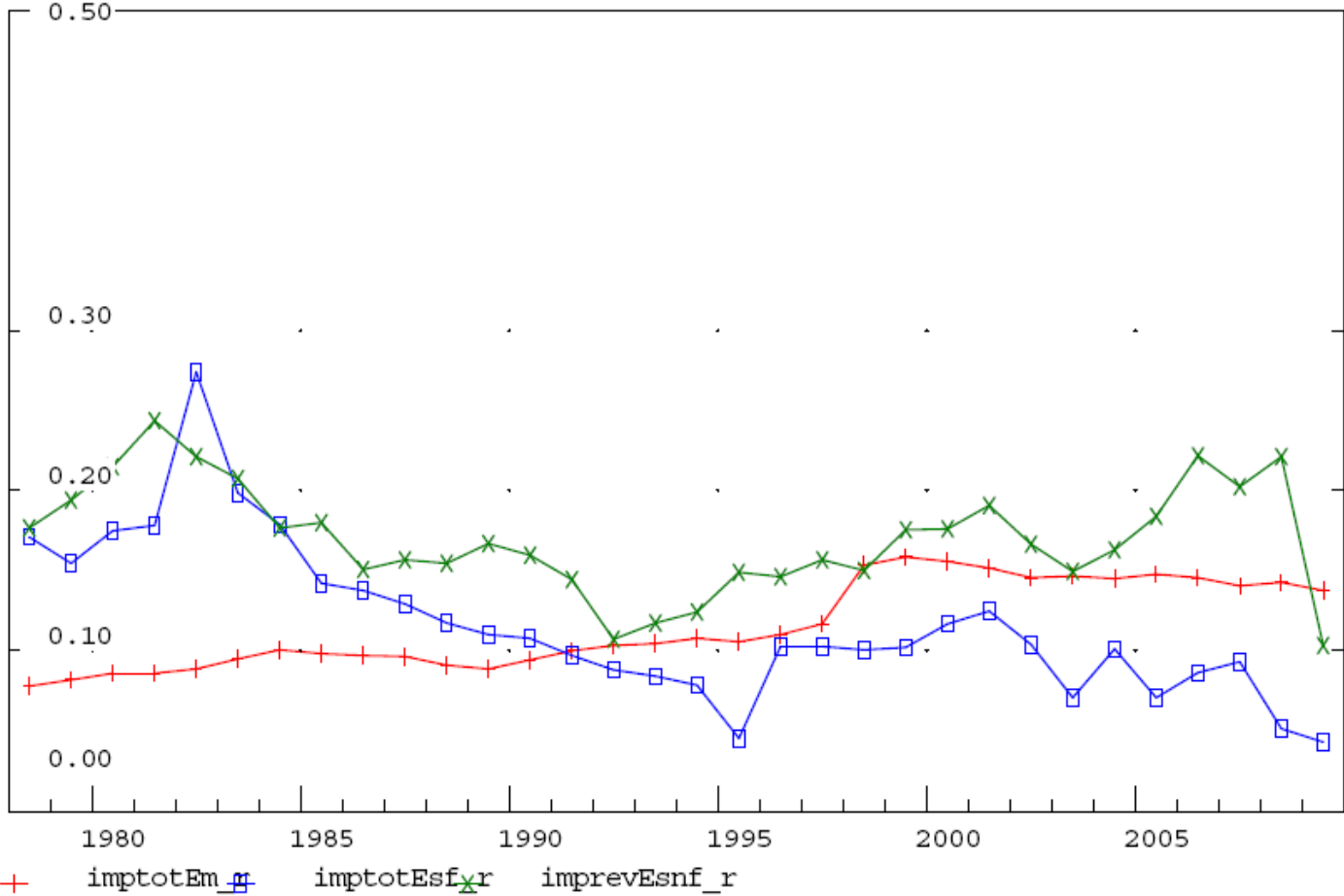
Social contributions are related to sectoral wages, while taxes on production to sectoral GDP.

In *model.cpp*

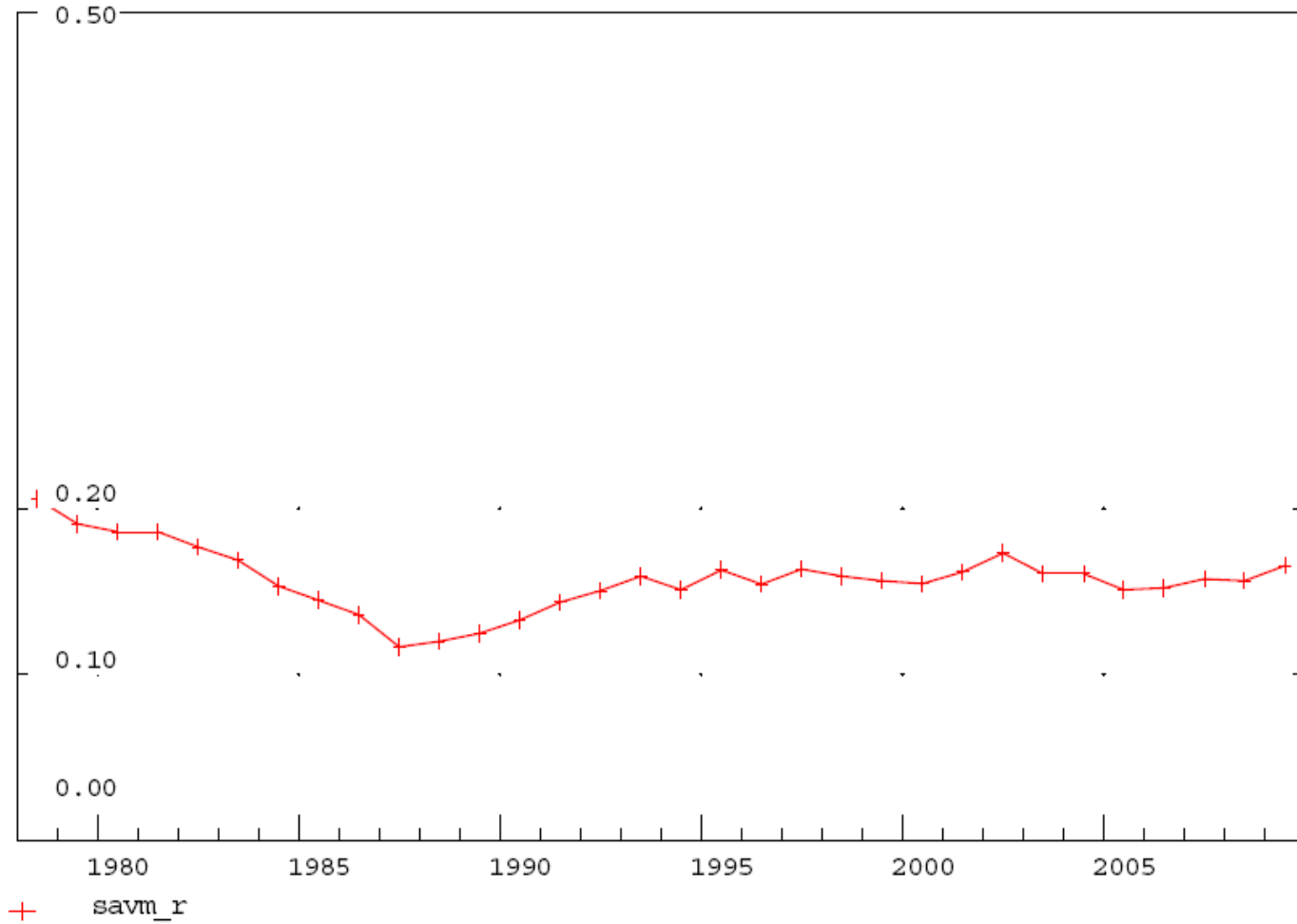
```
if(t>= MacEqStartDate){
    pcefunc();
    // Sum up the calculated PCE elements
    pcesum = pceio.sum();
    pcediscrep = pzetot[t] - pcesum;
    // printf("\npcediscrep = %10.2f\n",pcediscrep);
    // Spread the discrepancy by the proportions of the PCESpread vector.
    pceio = pceio + pcediscrep*PCESpread;
    // some macro equations
    invtotf();
}
invest = invtot[t]*invc;
gov=govtot[t]*govc;
isbl=isbltot[t]*isblc;
ex=extot[t]*exc;
// add up final demand components (without subtracting mports)
fd=pceio + gov + isbl + invest + ex;
// Solve input-ouput equations by Seidel method
Seidel(AM, out, fd, dump, triang, toler);
imtot[t]=im.sum();
lab = ebemul(labc,out);
cap = ebemul(capc,out);
indprod = ebemul(indprodc,out);
// The Accountant for FRANCE
gdp[t] = fd.sum()+imtot[t];
if(t>MacEqStartDate){
    labinc[t] = lab.sum();
    capinc[t] = cap.sum();
    indtax[t] = indprod.sum();
    accountf();
}
```

EFFECTIVE TAX RATES

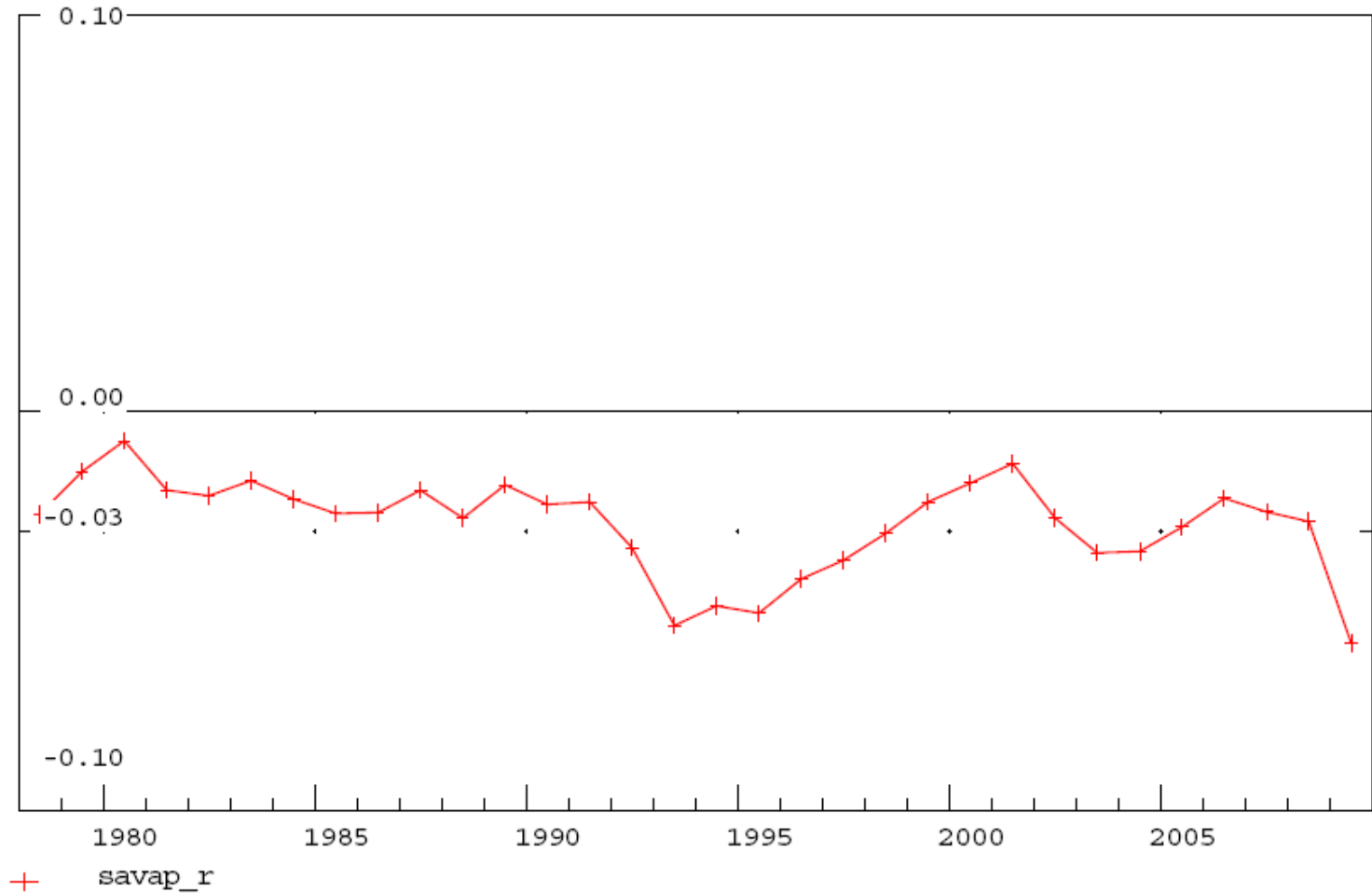
(taxes on income and property)



PRIVATE SAVINGS RATE



Total Government Net Lending/ Borrowing (percentage of GDP)



Thank you for your attention.