UNITED NATIONS

الاسكوا

ESCWA

WELCOME

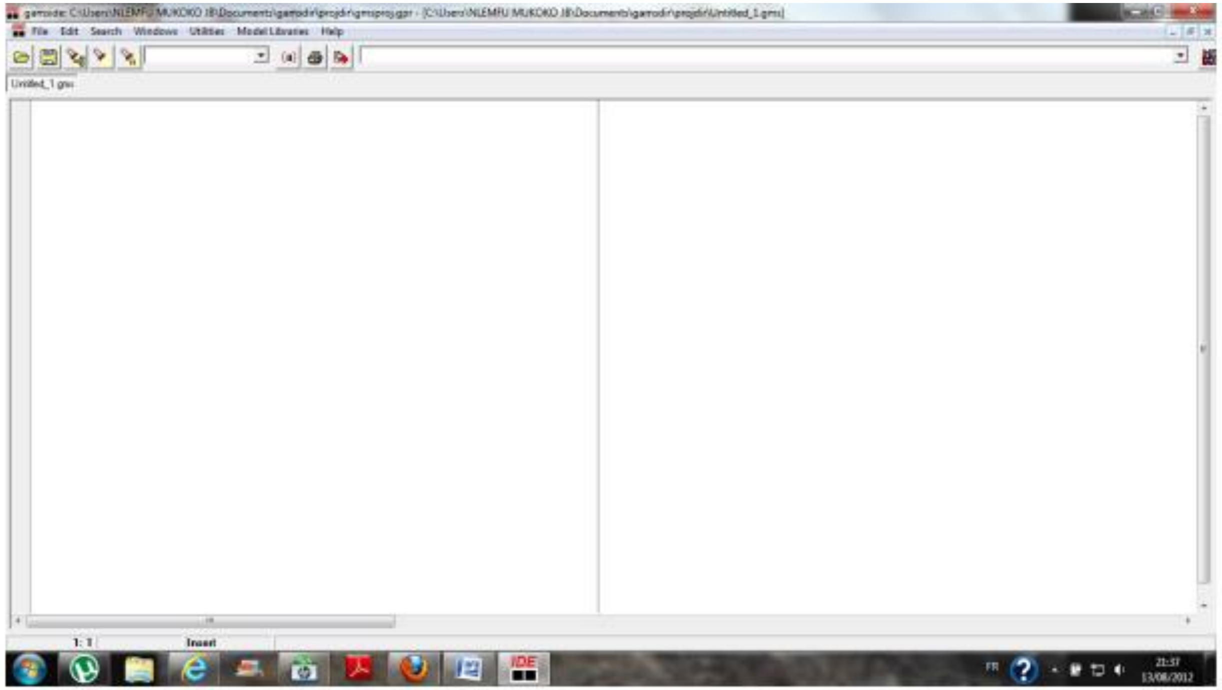
Session 10

Implementation of the AUTA model in GAMS

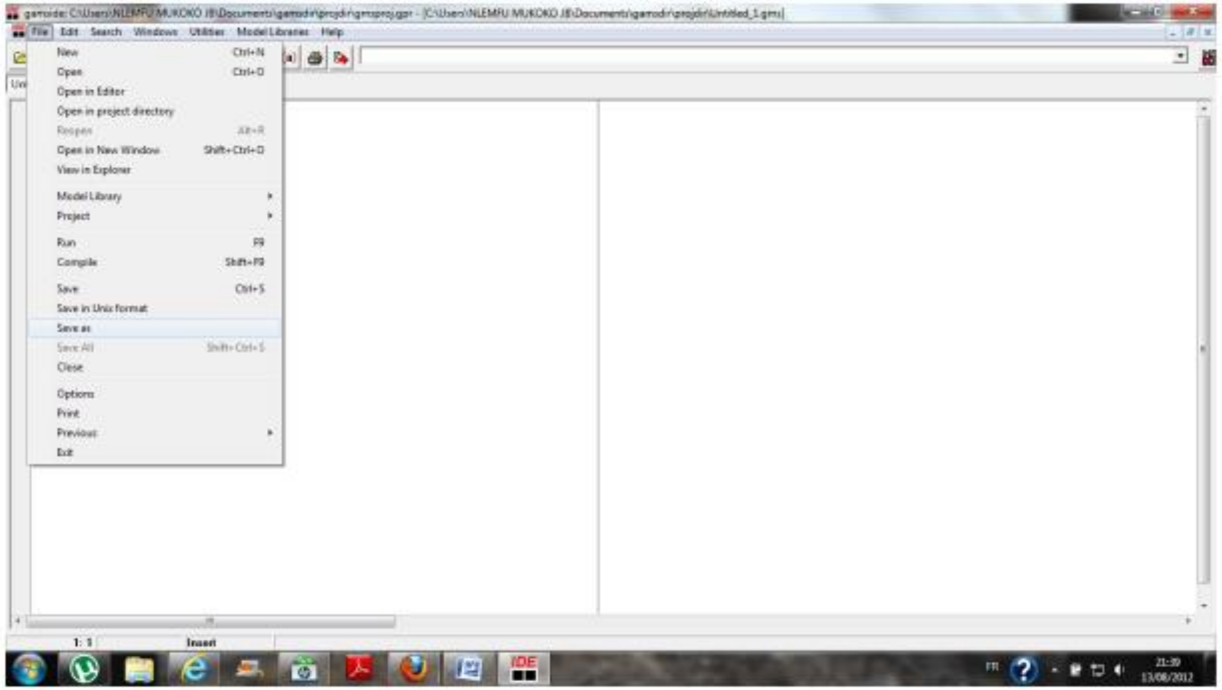
Solving & Testing the AUTA Model with GAMS

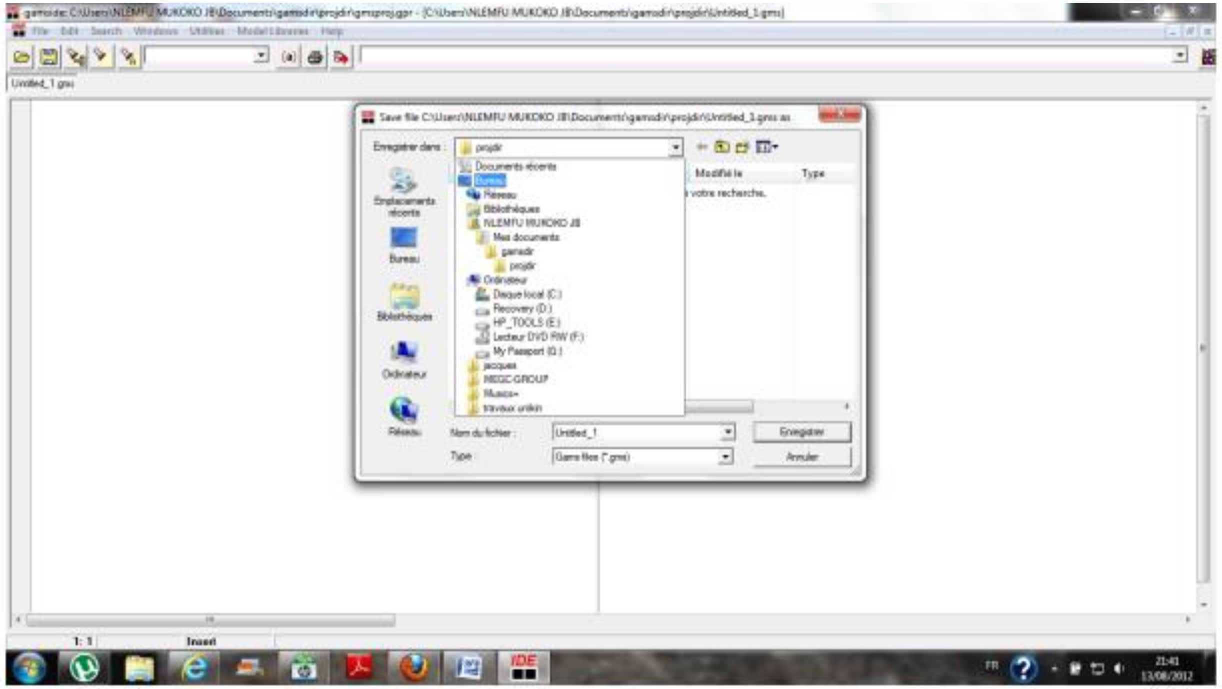
Create file or programing project

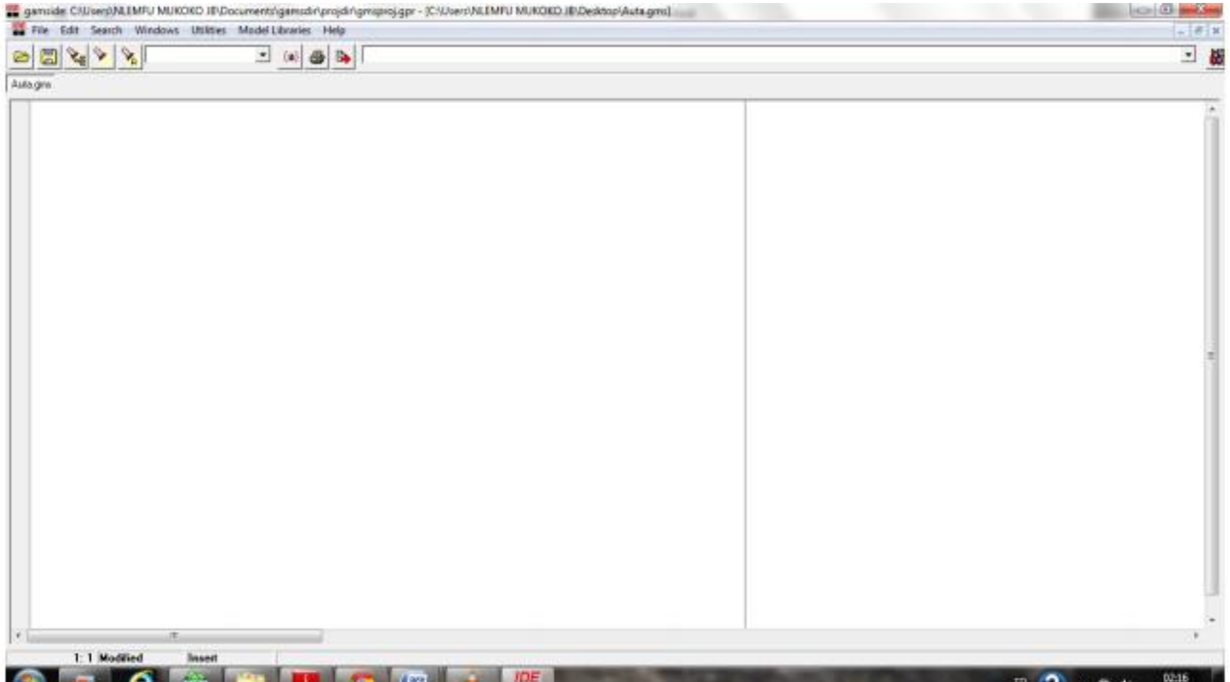
After downloading & installing the GAMS software, a shortcut will appear on your desktop (IDE): http//www.gams.com/dpwnload/



- Create a project file under gams: file/New/
- Name this file: file/save as/choose location/ Auta/Enter


File
Edit
Search
Windows
Utilities
Model Libraries
Help
New Ctrl+N
Open Ctrl+O
Open in Editor
Open in project directory
Reopen Alt+R
Open in New Window Shift+Ctrl+O
View in Explorer
Model Library
Project
Run F9
Compile Shift+F9
Save Ctrl+S
Save in Unix format
Save as
Save All Shift+Ctrl+S
Close
Options
Print
Previous
Exit
Insert


Enregistrer dans :
projdir
Documents récents
Bureau
Réseau
Bibliothèques
NLEMFU MUKOKO JB
Mes documents
gamsdir
projdir
Ordinateur
Disque local (C:)
Recovery (D:)
HP_TOOLS (E:)
Lecteur DVD RW (F:)
My Passport (G:)
Emplacements récents
Bureau
Bibliothèques
Ordinateur
Réseau
Modifié le
Type
Nom du fichier :
Untitled_1
Type :
Enregistrer
Annuler
Insert


File
Edit
Search
Windows
Utilities
Model Libraries
Help
Auta.gms
Modified
Insert

Outlook

- ***Step 1: Calibration***

- Set: Declare and define the groupings in the model
- Parameter: Declare & define the parameters and variables
- Data positioning
- Display: Allow presentation of data entered

- ***Step 2: Model***

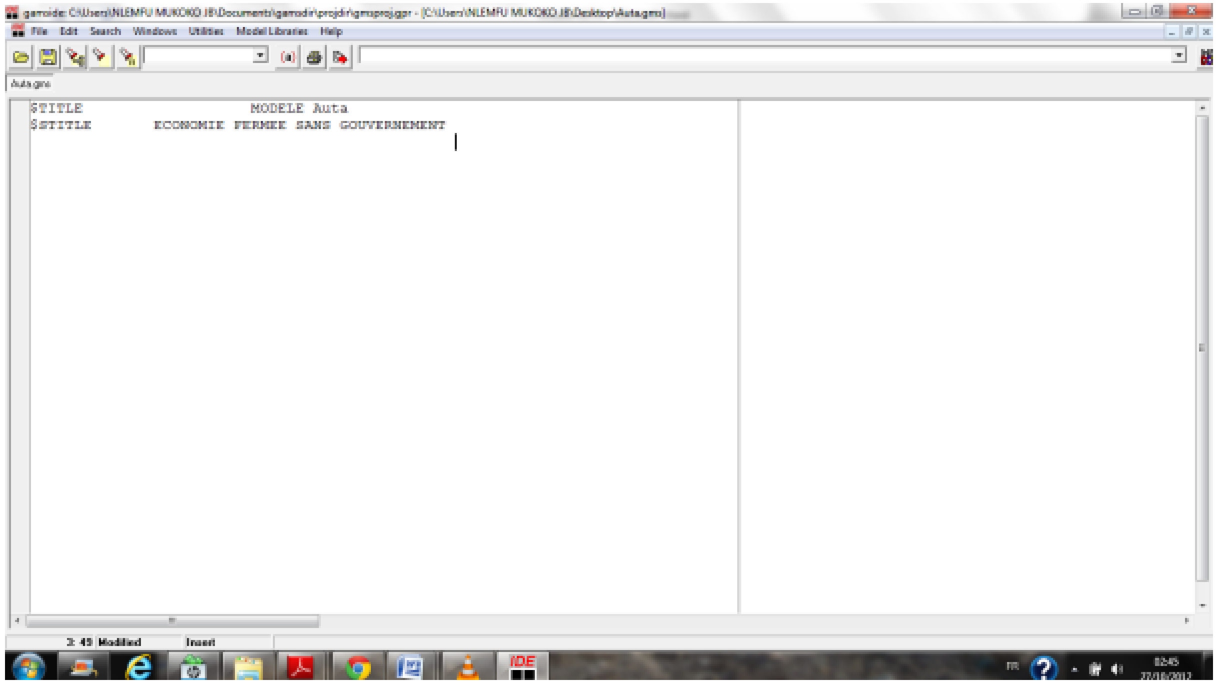
- Variables: Declare variables
- Equations:
- Declare and define equations

- ***Step 3: Resolution***

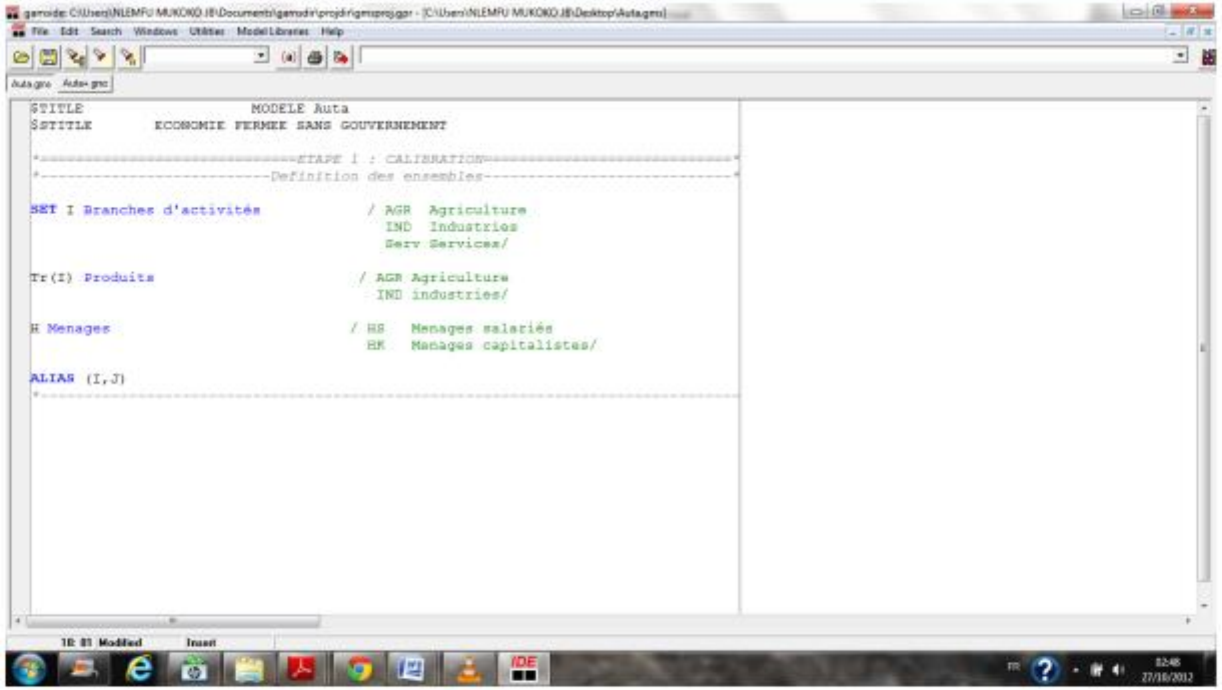
- Solve: Resolution of model

Step 1: Calibration

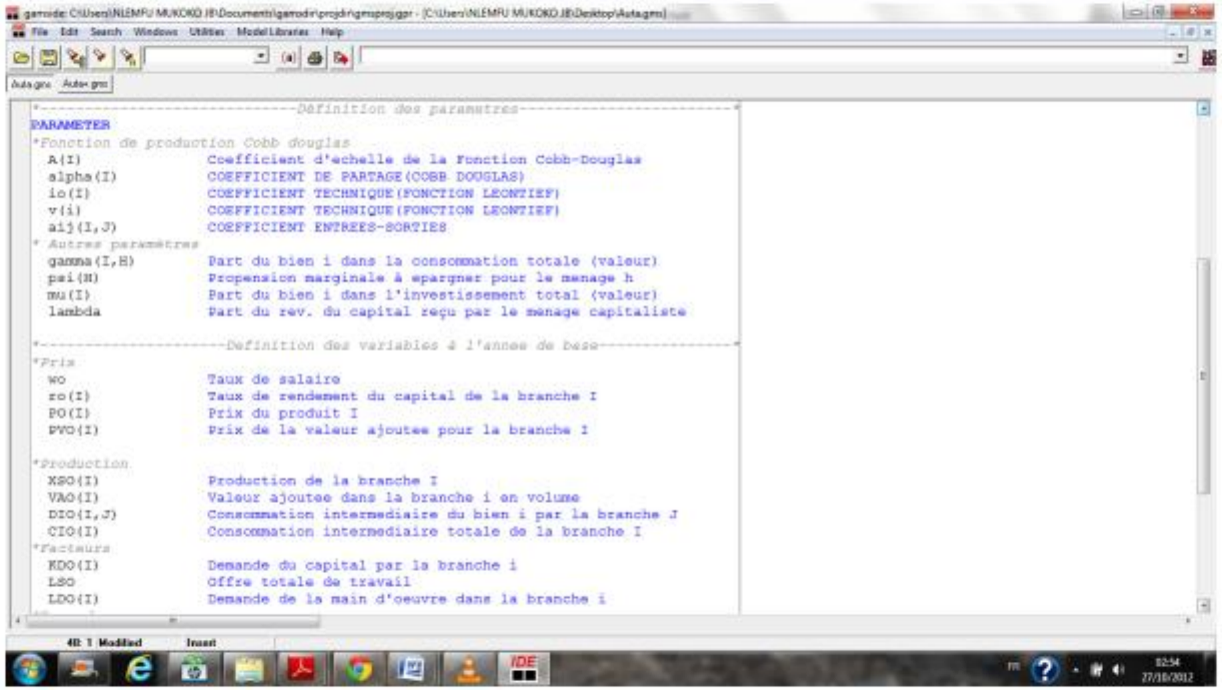
Give a title or subtitle to your project

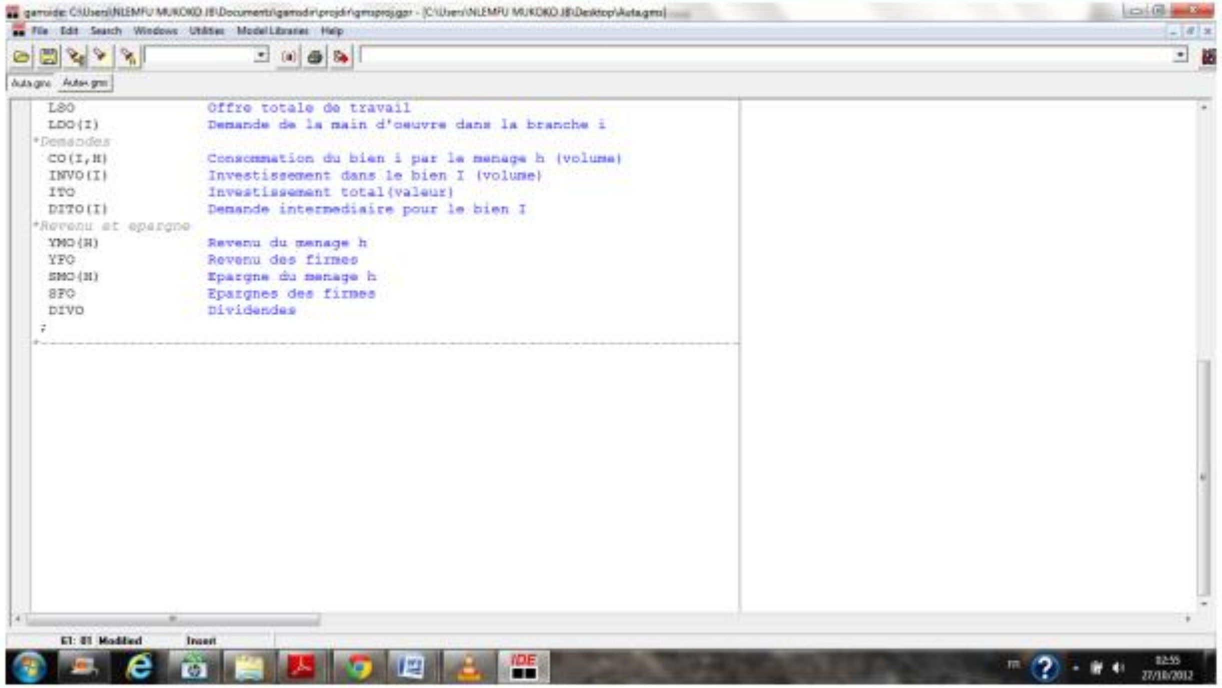


Set: Define & declare the groupings of the models

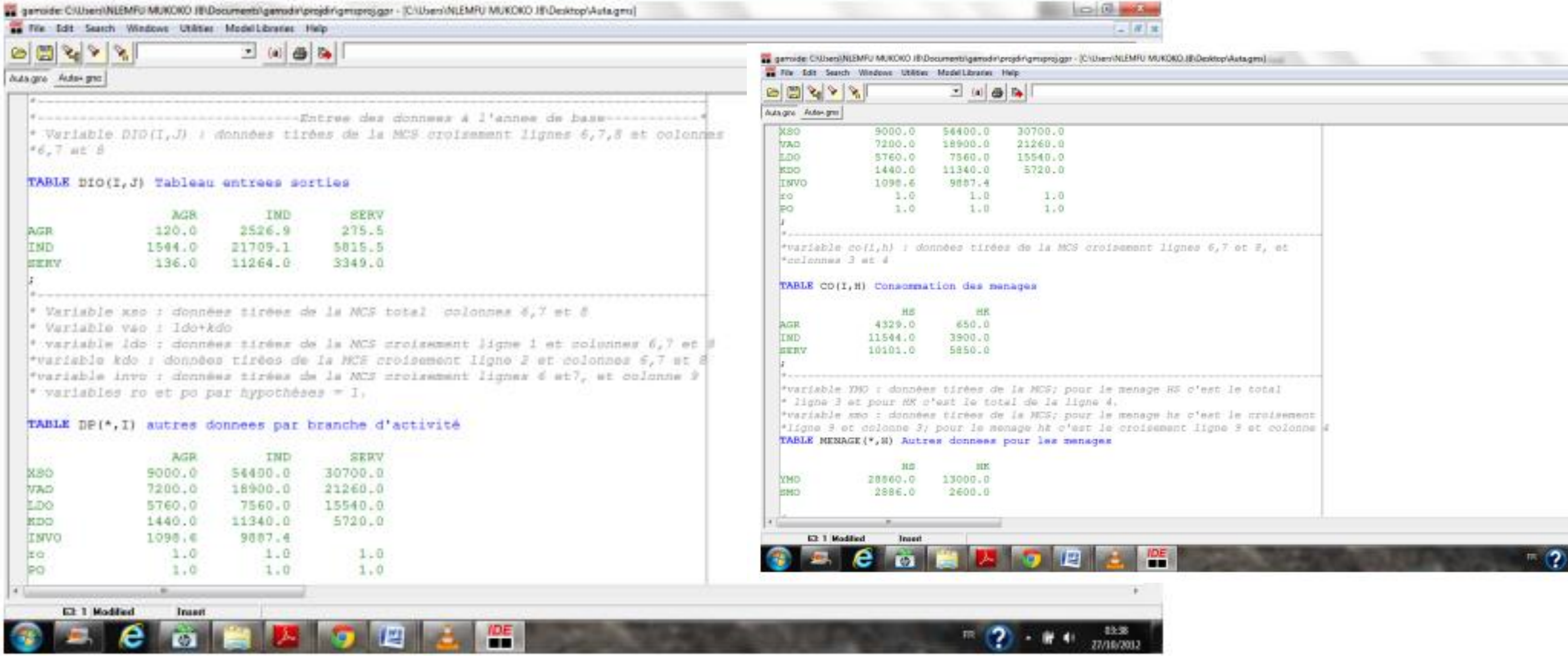


Parameter: Declare and define the parameters and variables of the base year





Assigning the data: At this point, enter the data from the SAM into the model. Be sure to assign all data to the different endogenous variables. To orientate yourself, by every table there are indicators that are given on the lines and columns of the MCS (see below)



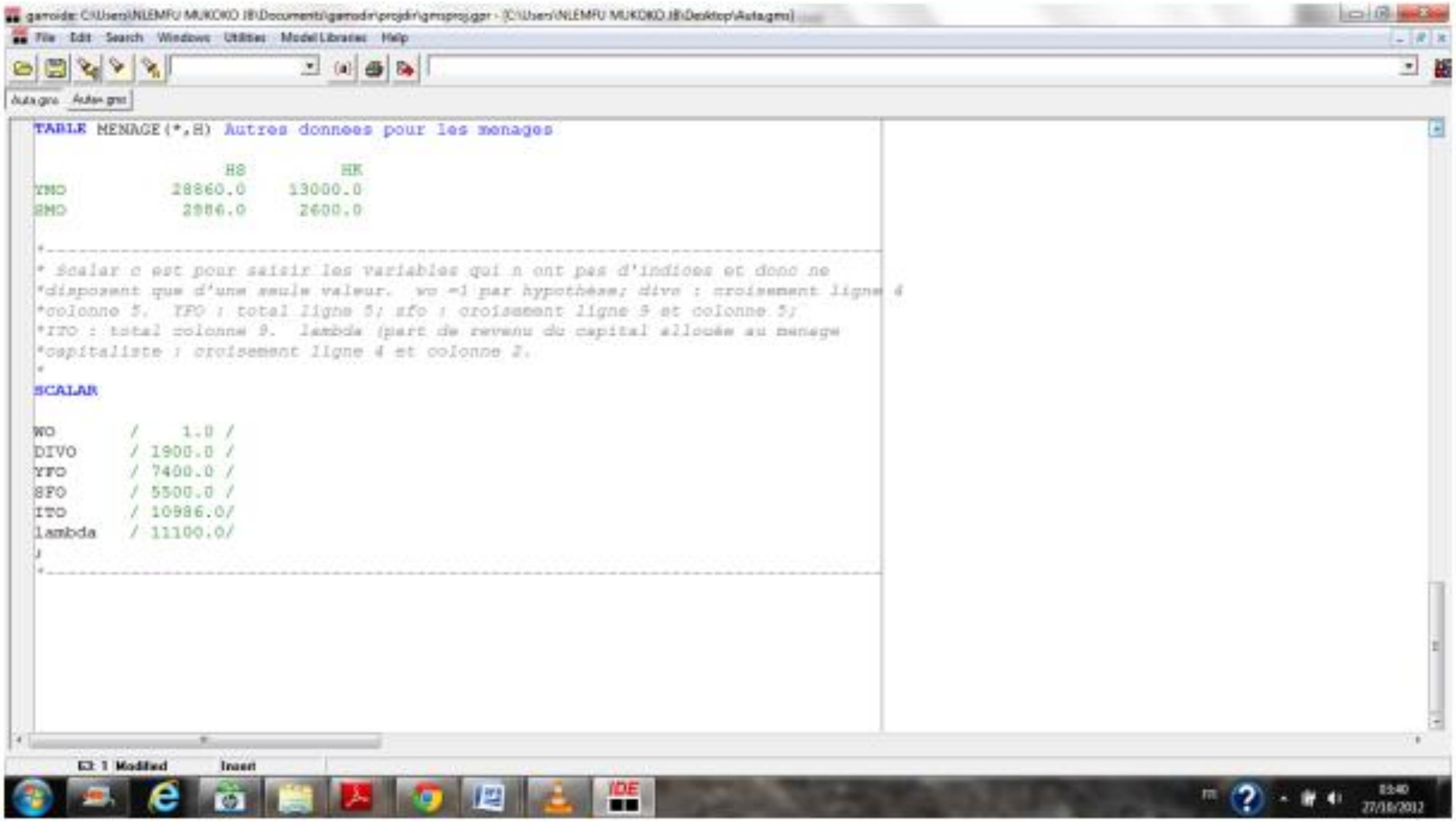
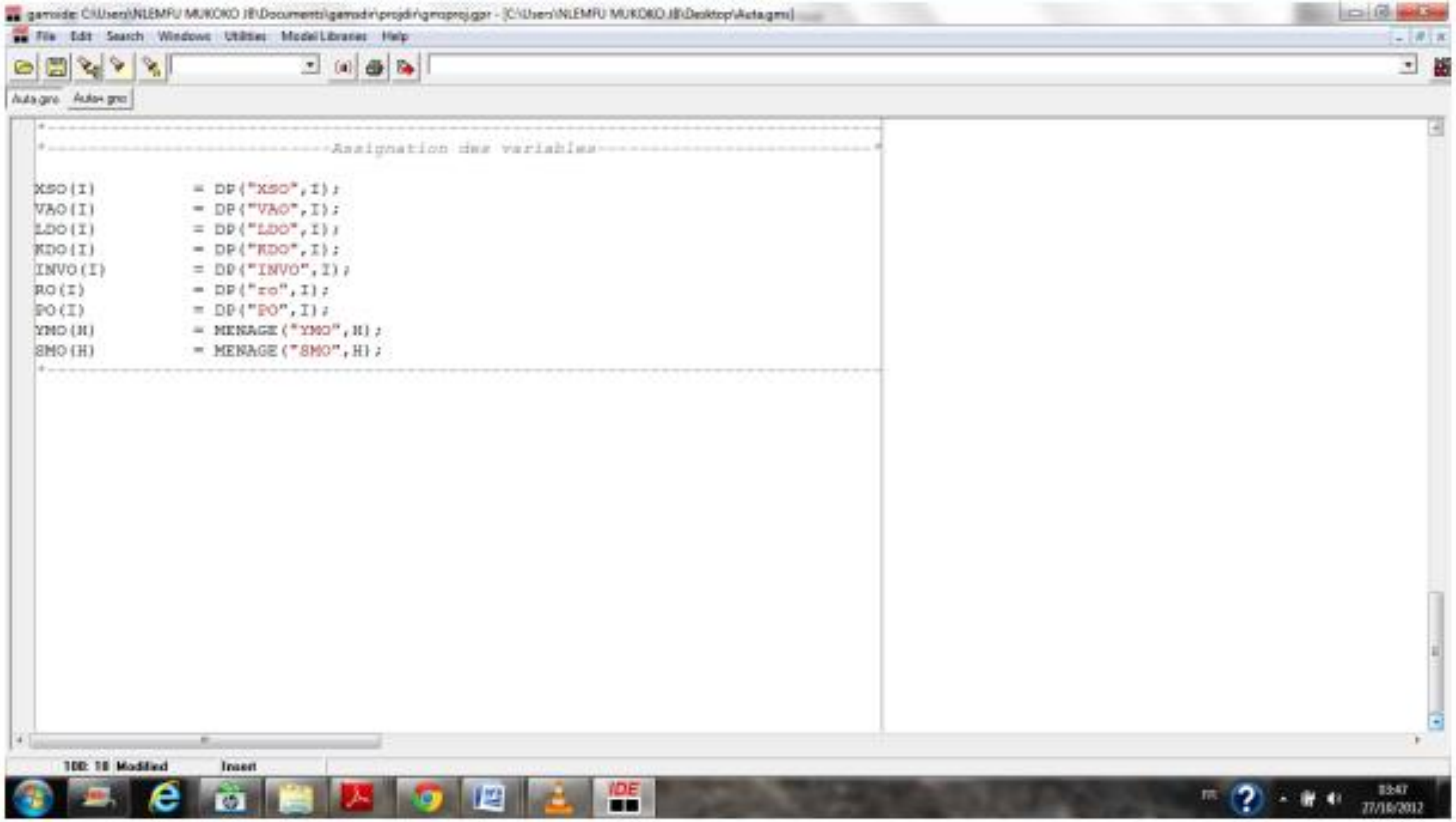
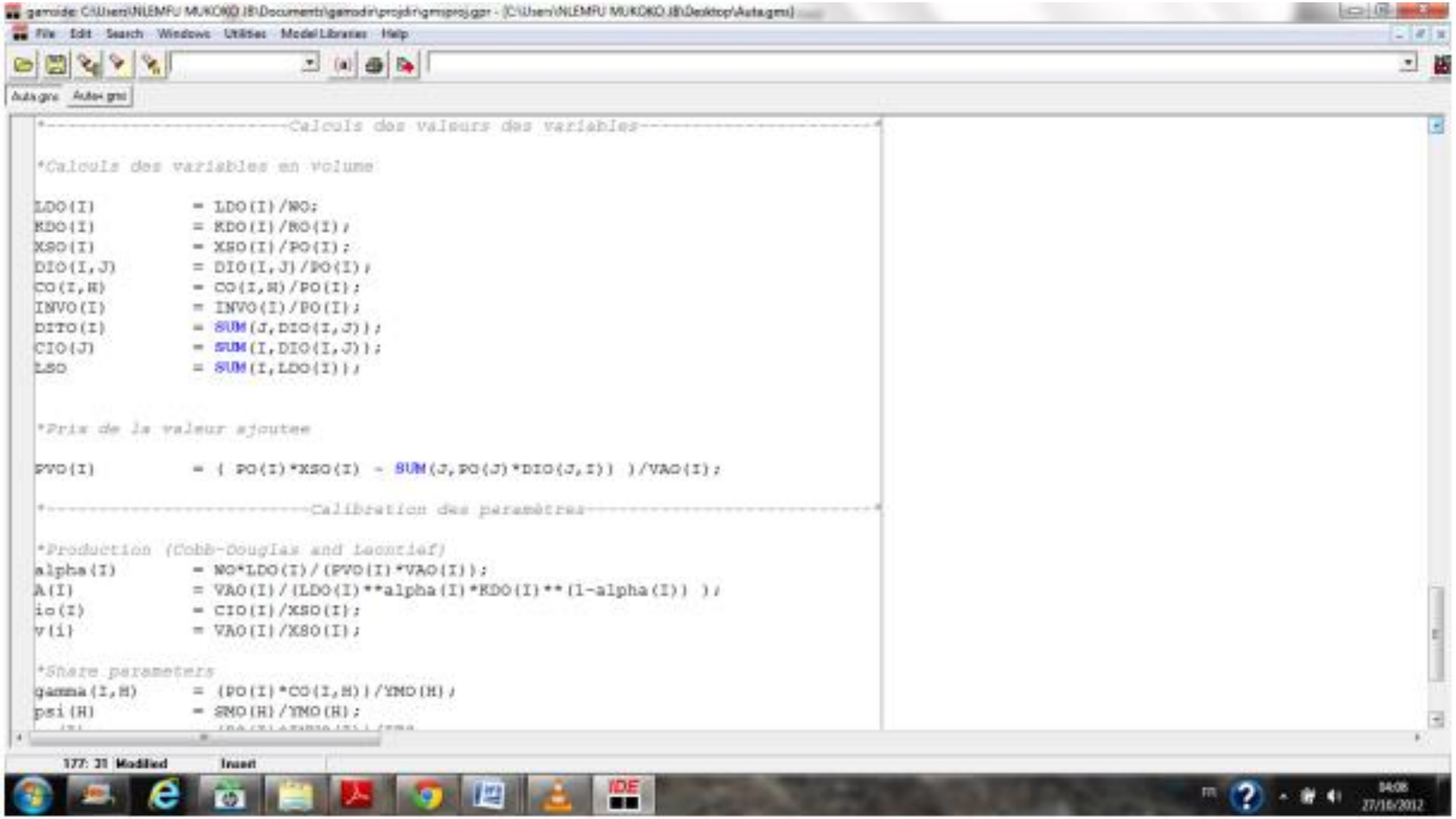


TABLE MENAGE(*,H) Autres donnees pour les menages
HS HK
YMO 28860.0 13000.0
SMO 2886.0 2600.0
*---
* Scalar c est pour saisir les variables qui n ont pas d'indices et donc ne
*disposent que d'une seule valeur. wo =1 par hypothèse; divo : croisement ligne 4
*colonne 5. YFO : total ligne 5; sfo : croisement ligne 9 et colonne 5;
*ITO : total colonne 9. lambda (part de revenu du capital allouée au menage
*capitaliste : croisement ligne 4 et colonne 2.
*
SCALAR
WO / 1.0 /
DIVO / 1900.0 /
YFO / 7400.0 /
SFO / 5500.0 /
ITO / 10986.0/
lambda / 11100.0/
;
*---
Modified
Insert

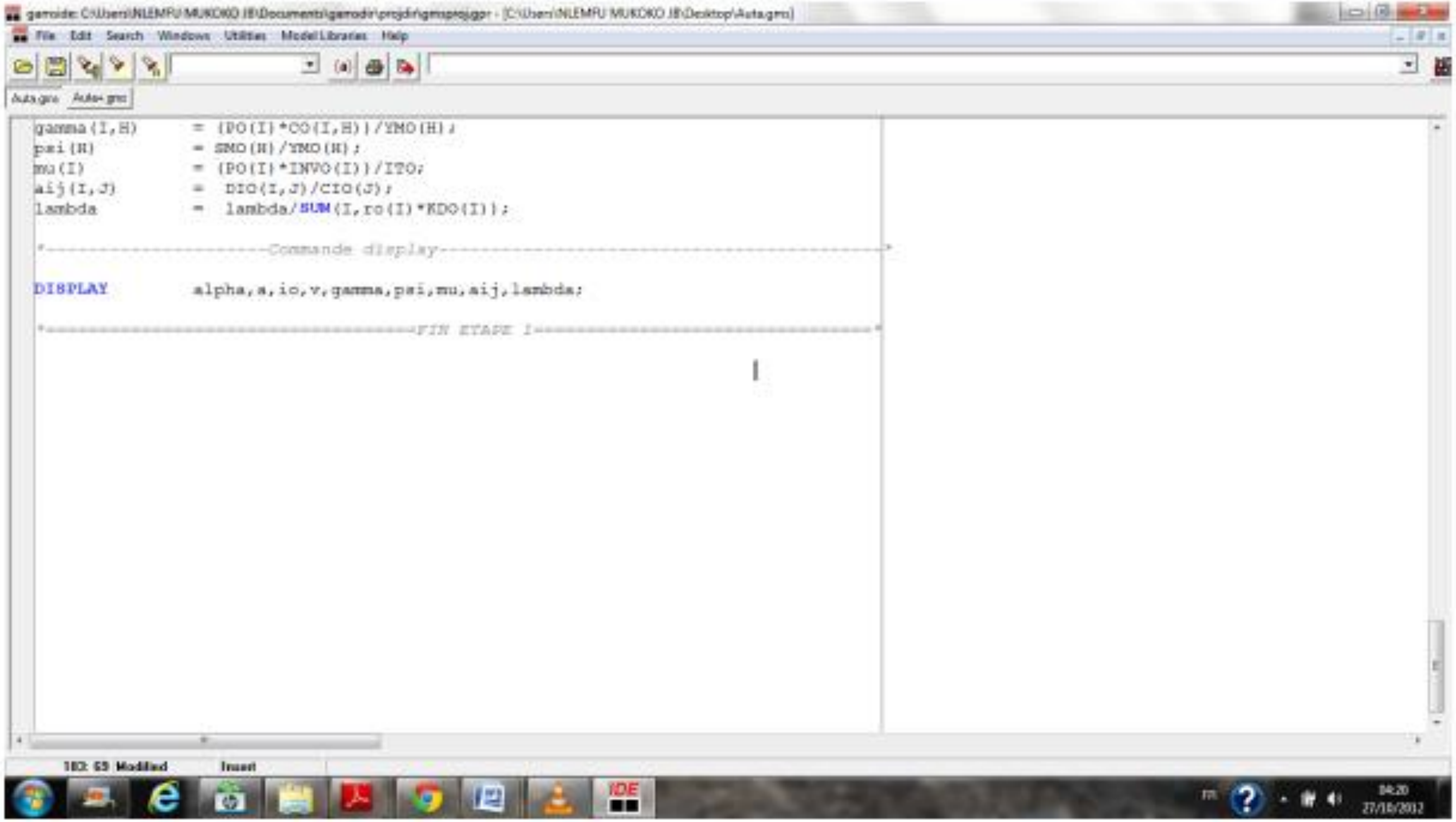
Now that all the data from the SAM is integrated in the model, we must assign variables to them. This assignment is realized only for the variables contained within the tables << TABLE DP(*,I)>> and <<TABLES HOUSEHOLD(*,H)>>.



Calculate variables in volume and other parameters

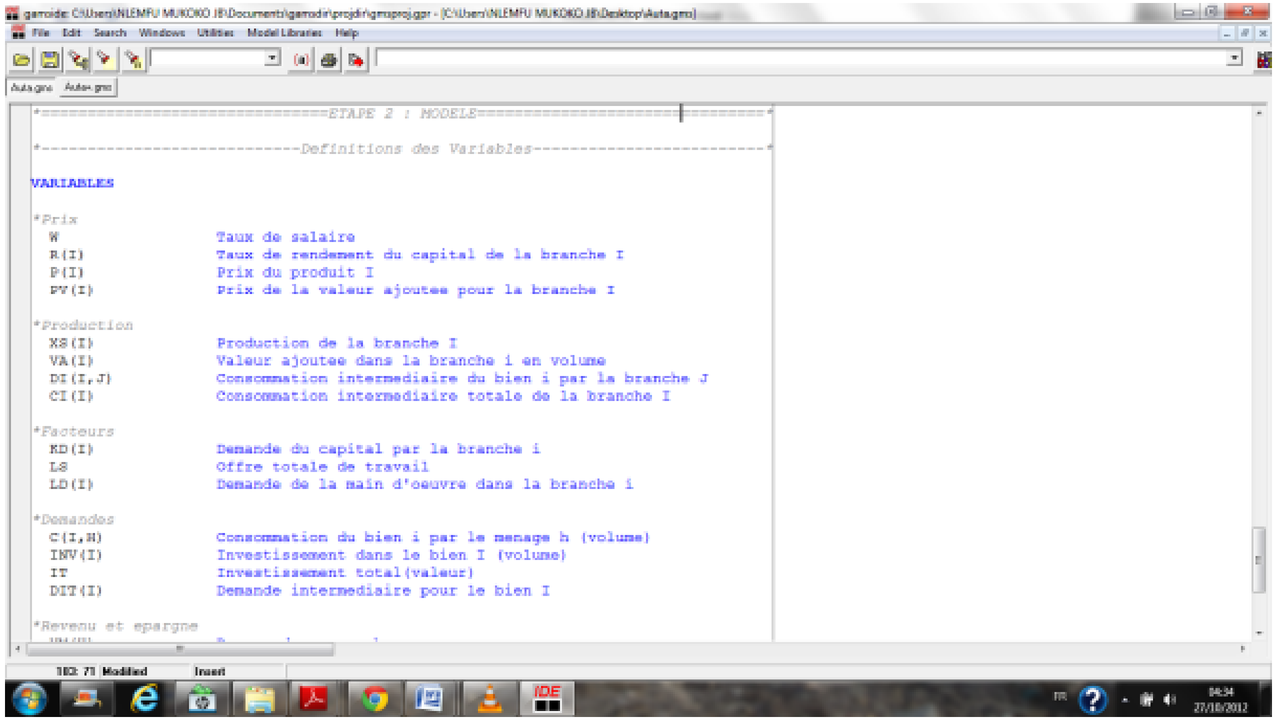


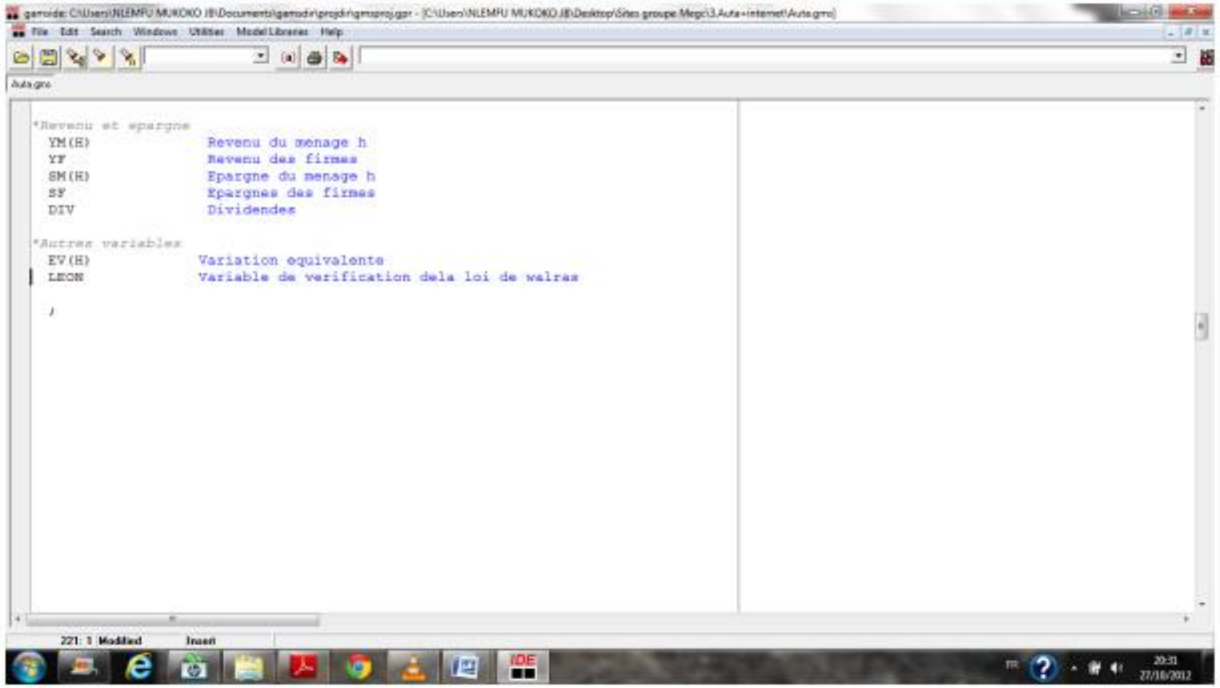
Command display: permit to



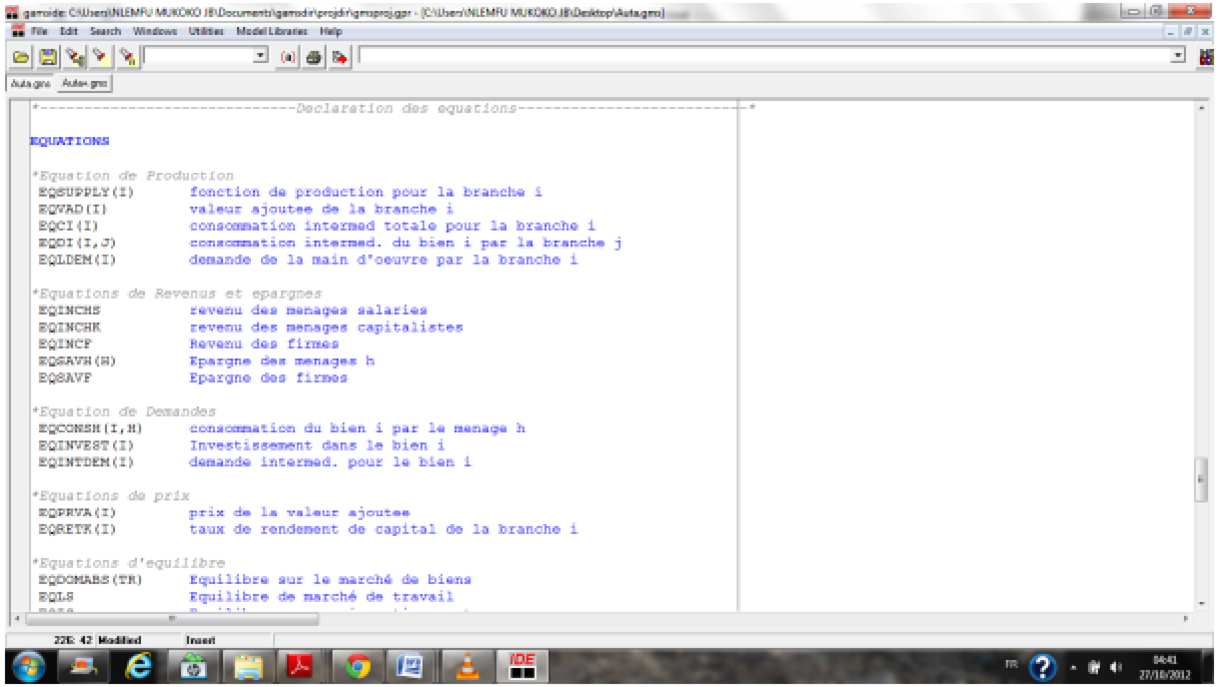
Step 2: Model

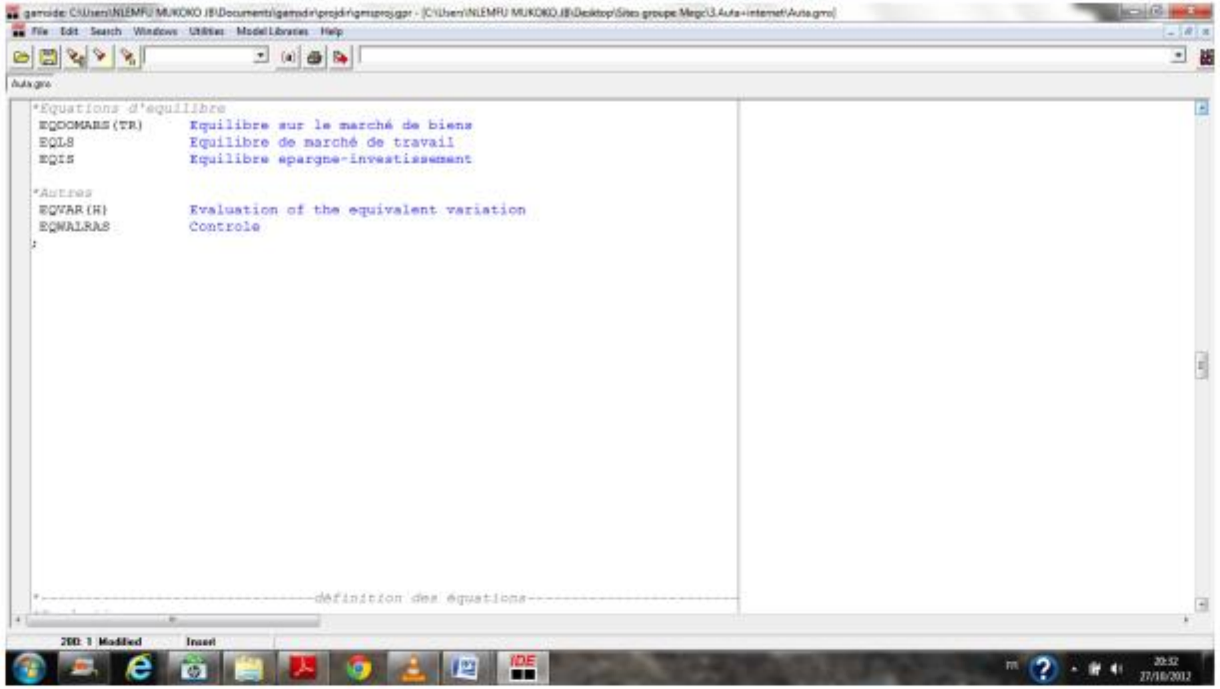
- Variables: Declare the variables of the model

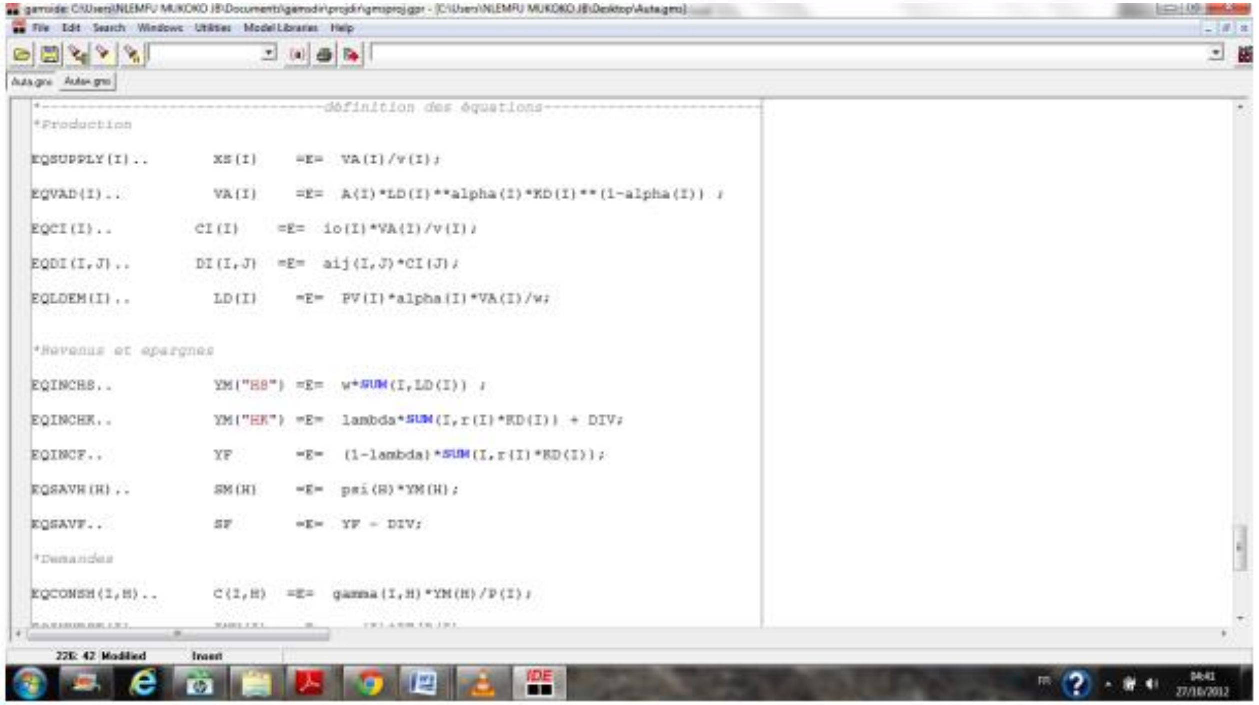




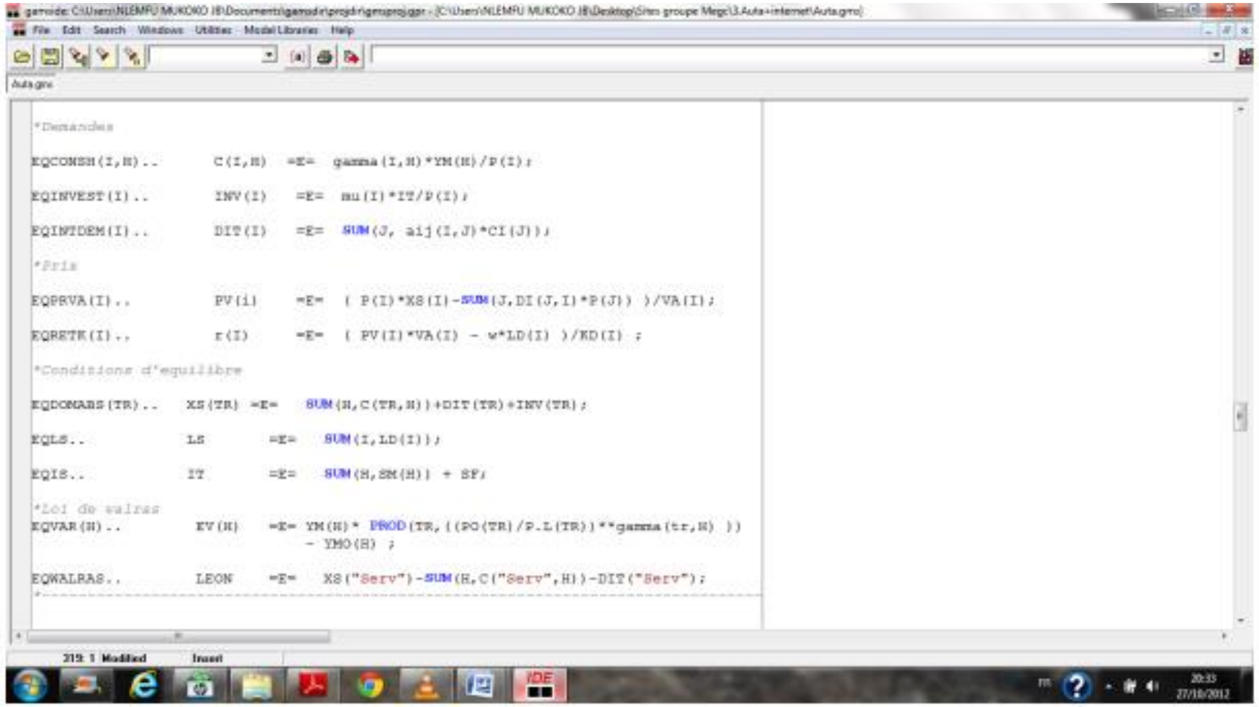
- Equations: Declare & define equations





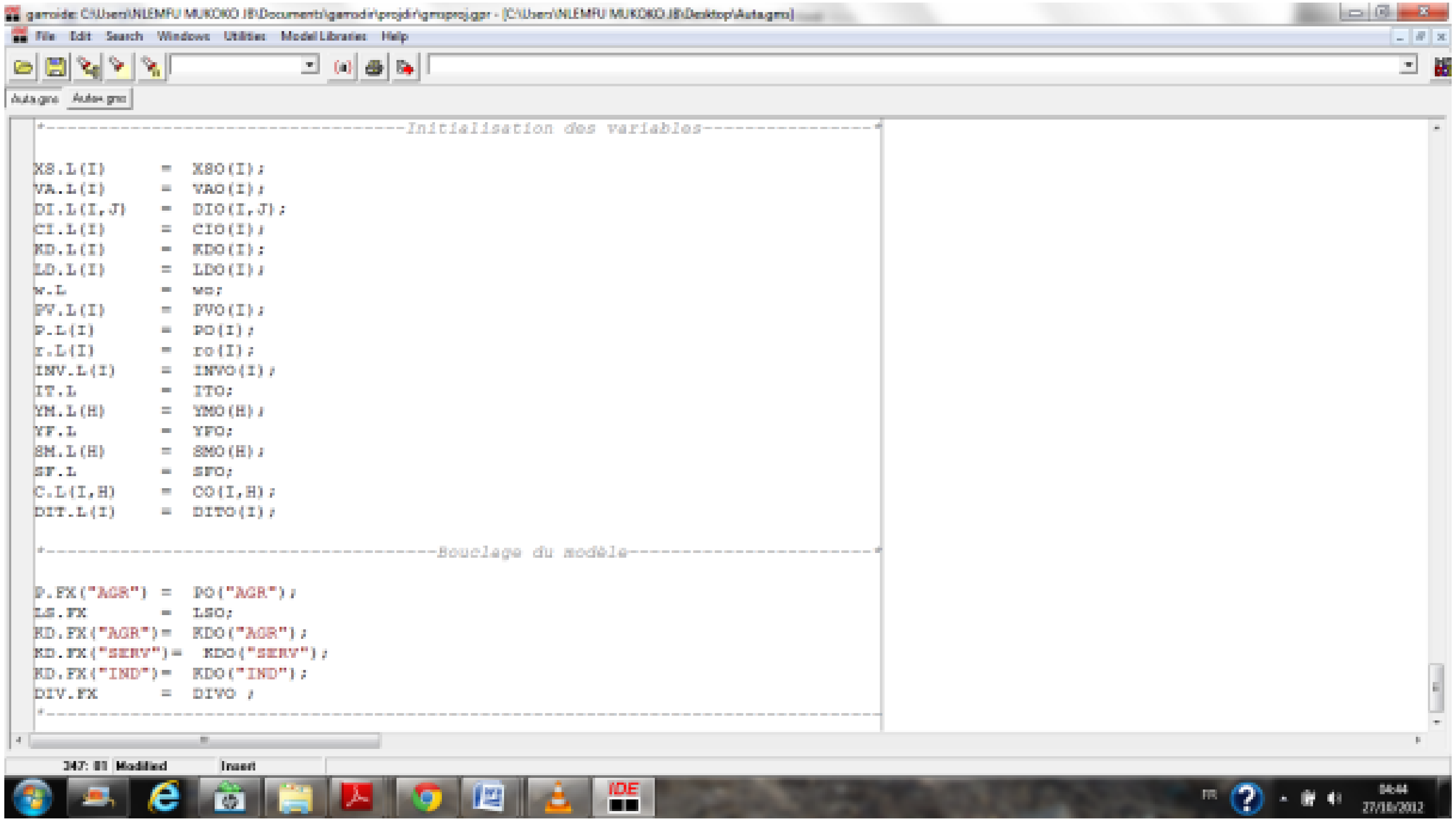


*-----------------------------définition des équations-----------------------------
*Production
EQSUPPLY(I)..   XS(I)   =E= VA(I)/v(I);
EQVAD(I)..   VA(I)   =E= A(I)*LD(I)**alpha(I)*KD(I)**(1-alpha(I)) ;
EQCI(I)..   CI(I)   =E= io(I)*VA(I)/v(I);
EQDI(I,J)..   DI(I,J)   =E= aij(I,J)*CI(J);
EQLDEM(I)..   LD(I)   =E= PV(I)*alpha(I)*VA(I)/w;
*Revenus et epargnes
EQINCHS..   YM("HS") =E= w*SUM(I,LD(I)) ;
EQINCHK..   YM("HK") =E= lambda*SUM(I,r(I)*KD(I)) + DIV;
EQINCF..   YF   =E= (1-lambda)*SUM(I,r(I)*KD(I));
EQSAVH(H)..   SM(H)   =E= psi(H)*YM(H);
EQSAVF..   SF   =E= YF - DIV;
*Demandes
EQCONSH(I,H)..   C(I,H)   =E= gamma(I,H)*YM(H)/P(I);

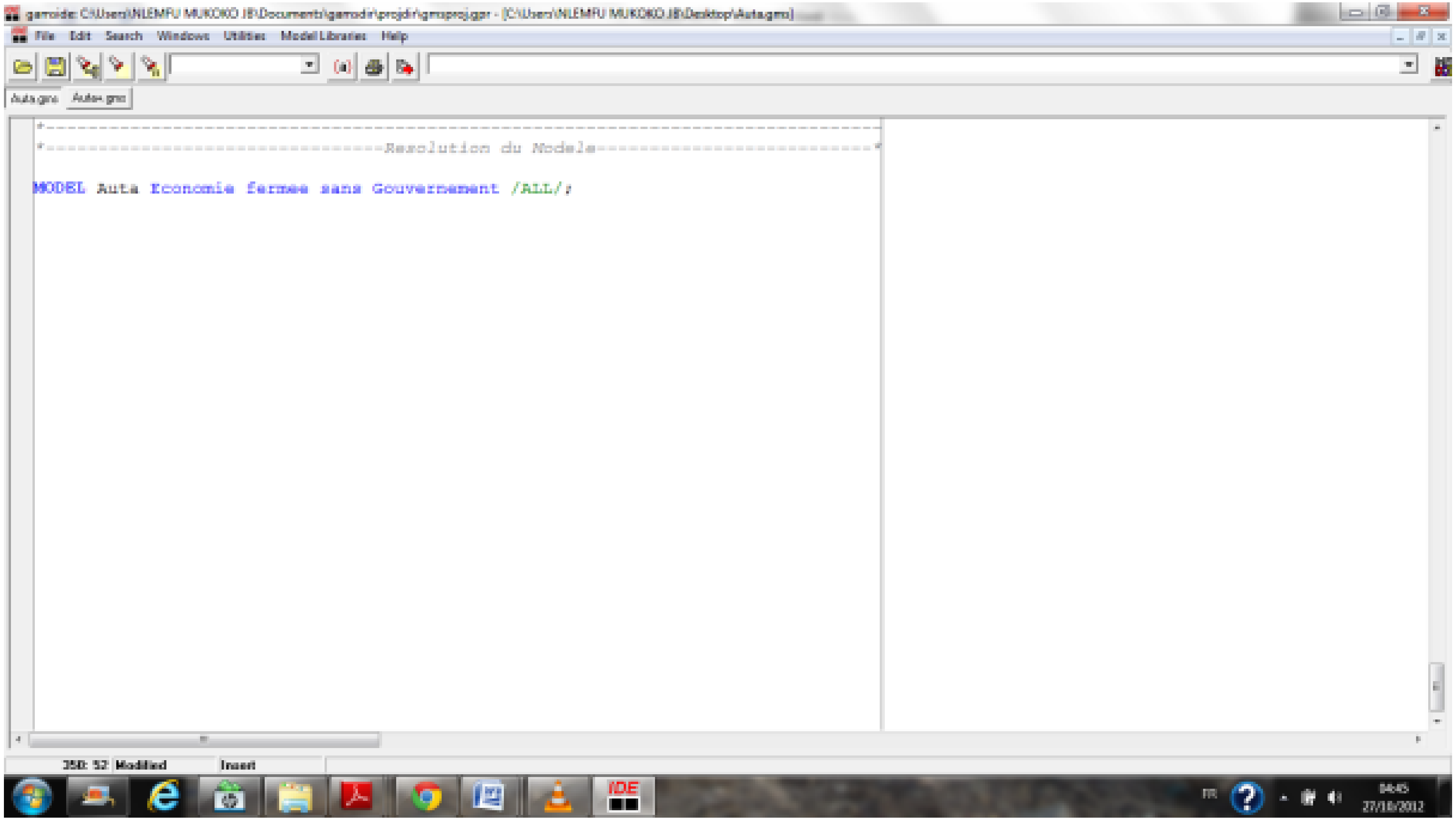


*Demandes
EQCONSH(I,H)..   C(I,H)   =E= gamma(I,H)*YM(H)/P(I);
EQINVEST(I)..   INV(I)   =E= mu(I)*IT/P(I);
EQINTDEM(I)..   DIT(I)   =E= SUM(J, aij(I,J)*CI(J));
*Prix
EQPRVA(I)..   PV(i)   =E= (P(I)*XS(I)-SUM(J,DI(J,I)*P(J)))/VA(I);
EQRETK(I)..   r(I)   =E= (PV(I)*VA(I) - w*LD(I))/KD(I) ;
*Conditions d'equilibre
EQDOMABS(TR)..   XS(TR) =E=   SUM(H,C(TR,H))+DIT(TR)+INV(TR);
EQLS..   LS   =E=   SUM(I,LD(I));
EQIS..   IT   =E=   SUM(H,SM(H)) + SF;
*Loi de walras
EQVAR(H)..   EV(H)   =E= YM(H)* PROD(TR,((PO(TR)/P.L(TR))**gamma(tr,H)))
- YMO(H) ;
EQWALRAS..   LEON   =E=   XS("Serv")-SUM(H,C("Serv",H))-DIT("Serv");

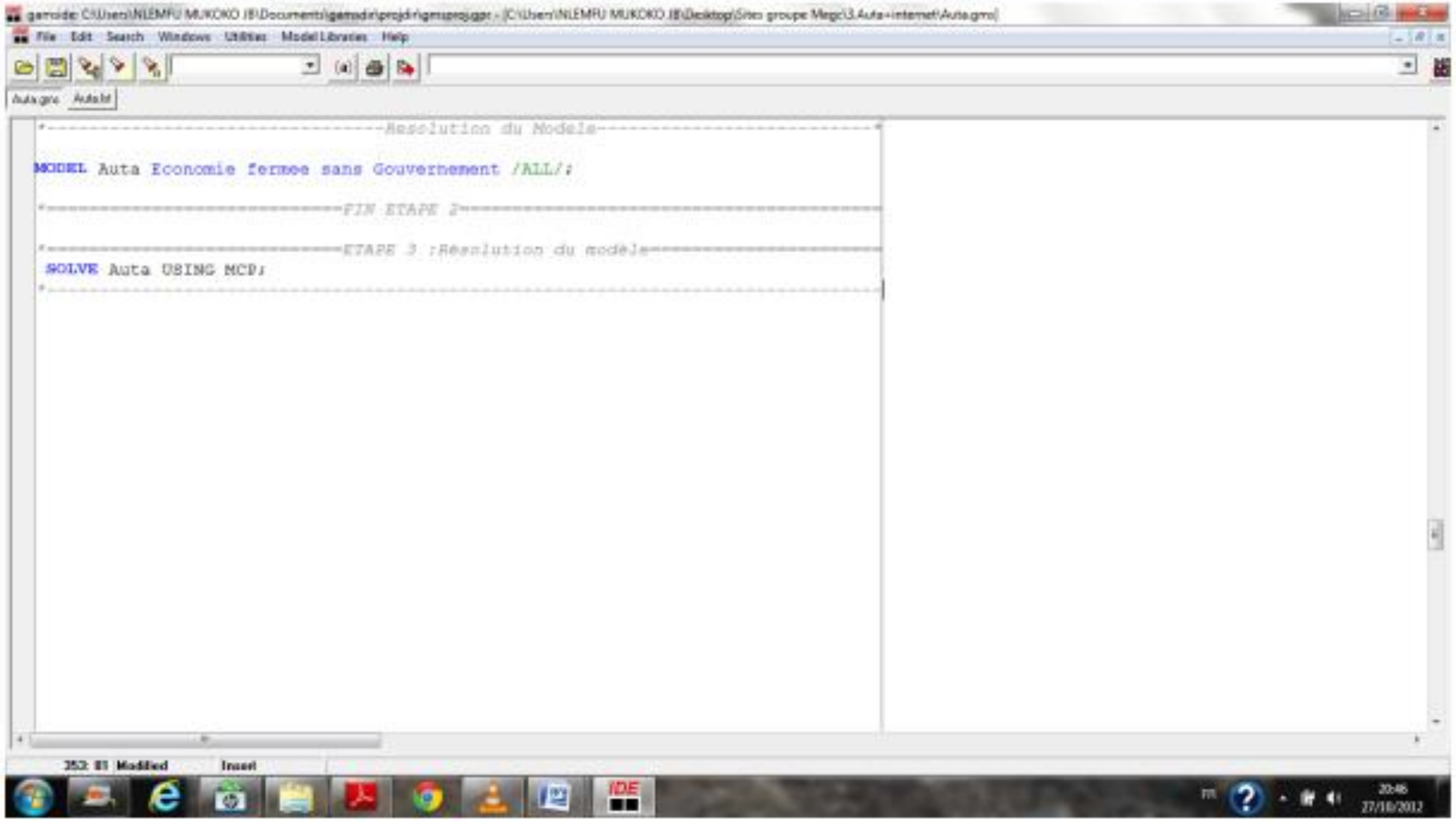
- Initialization of variables



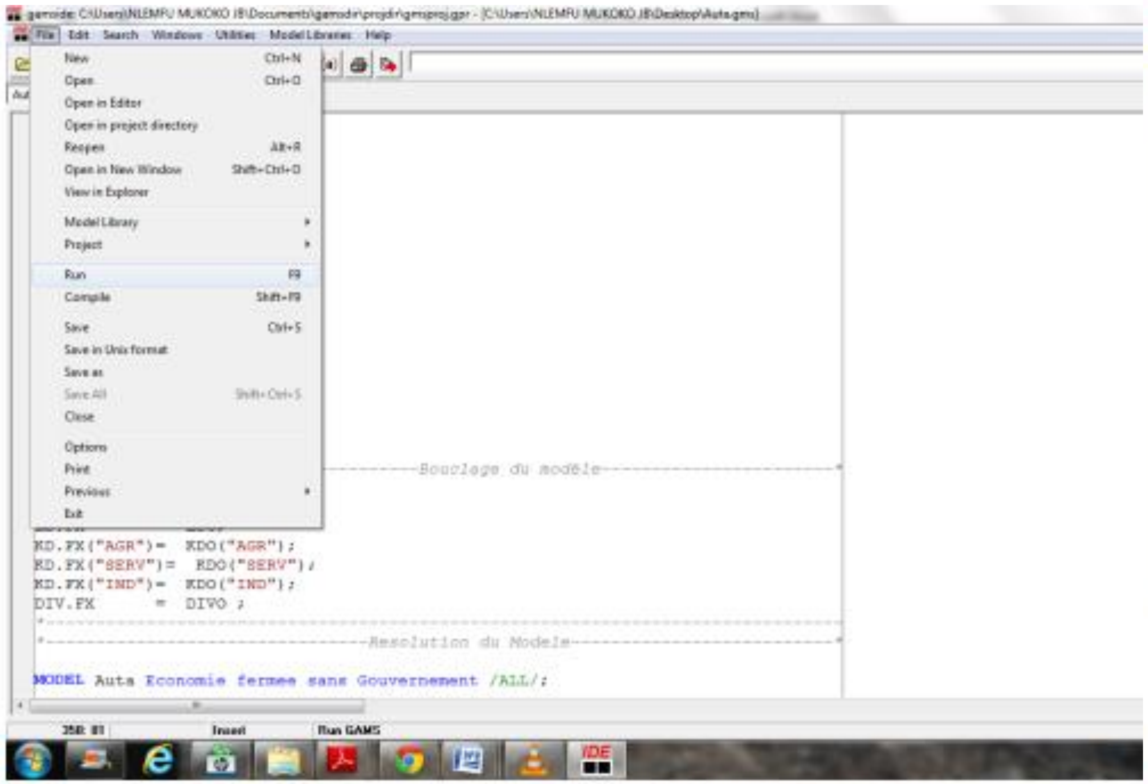
Model: Define the model

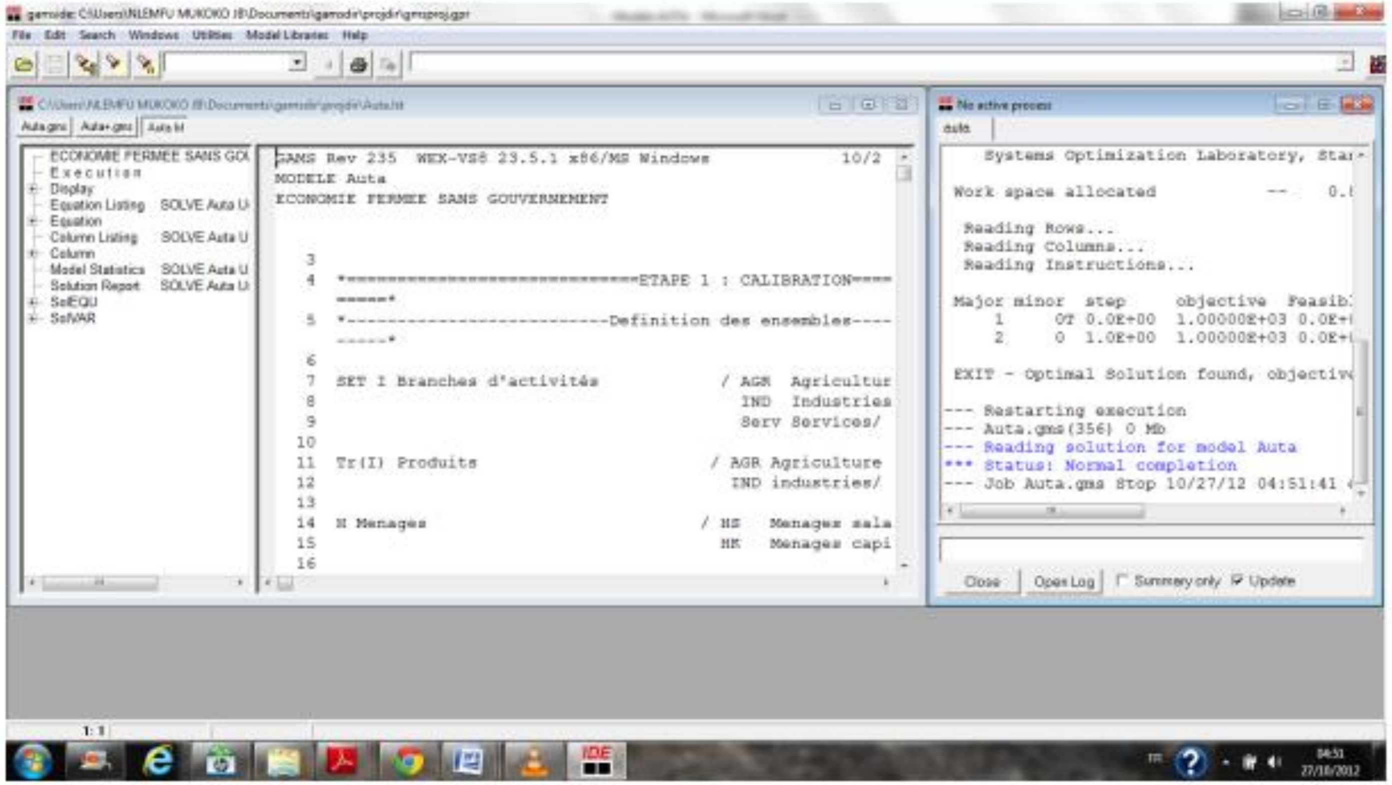


Step 3: Resolution of the Model

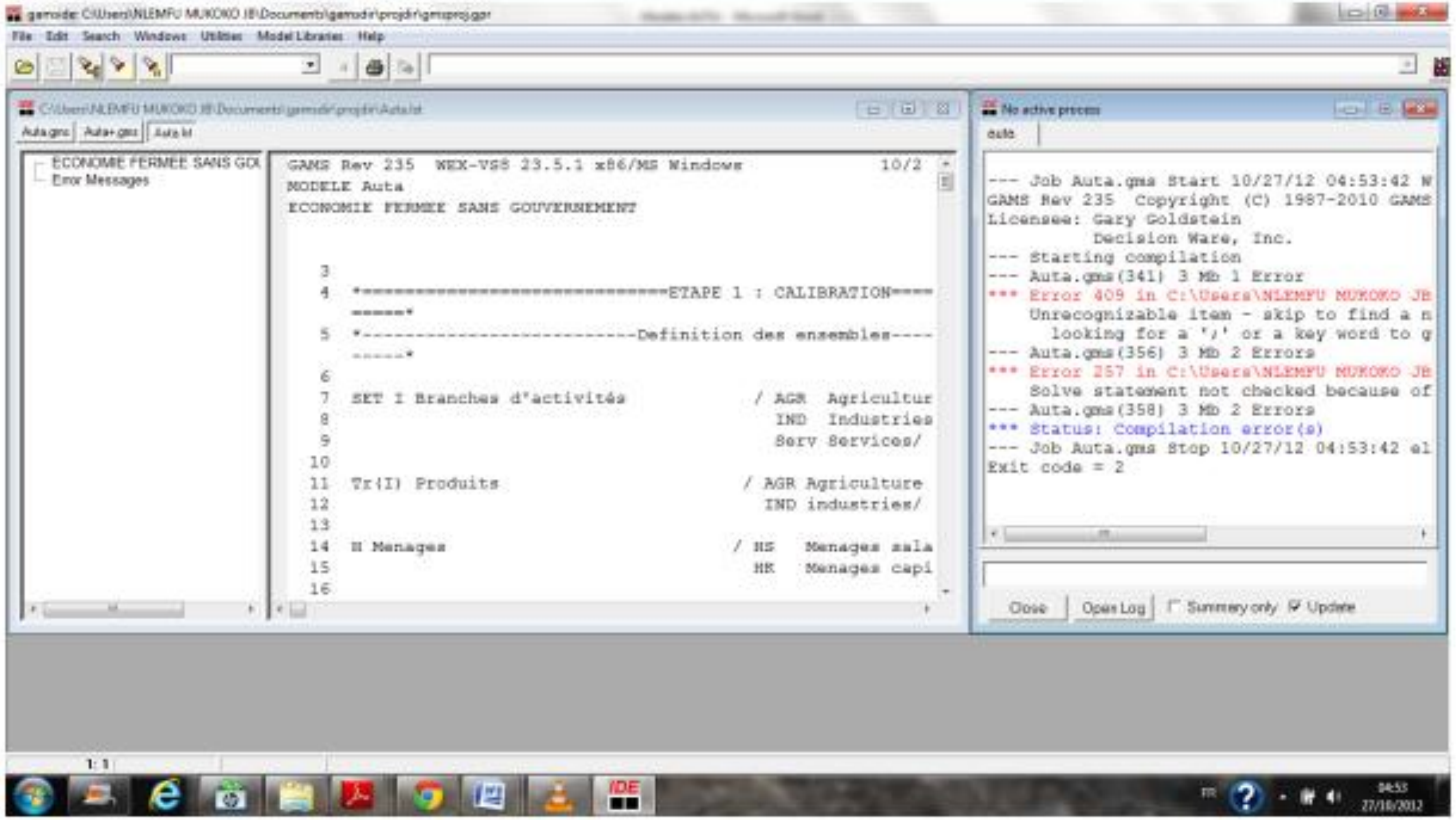


At this point, we finished with programing of our model. To solve it go to: **File/Run or click on F9**

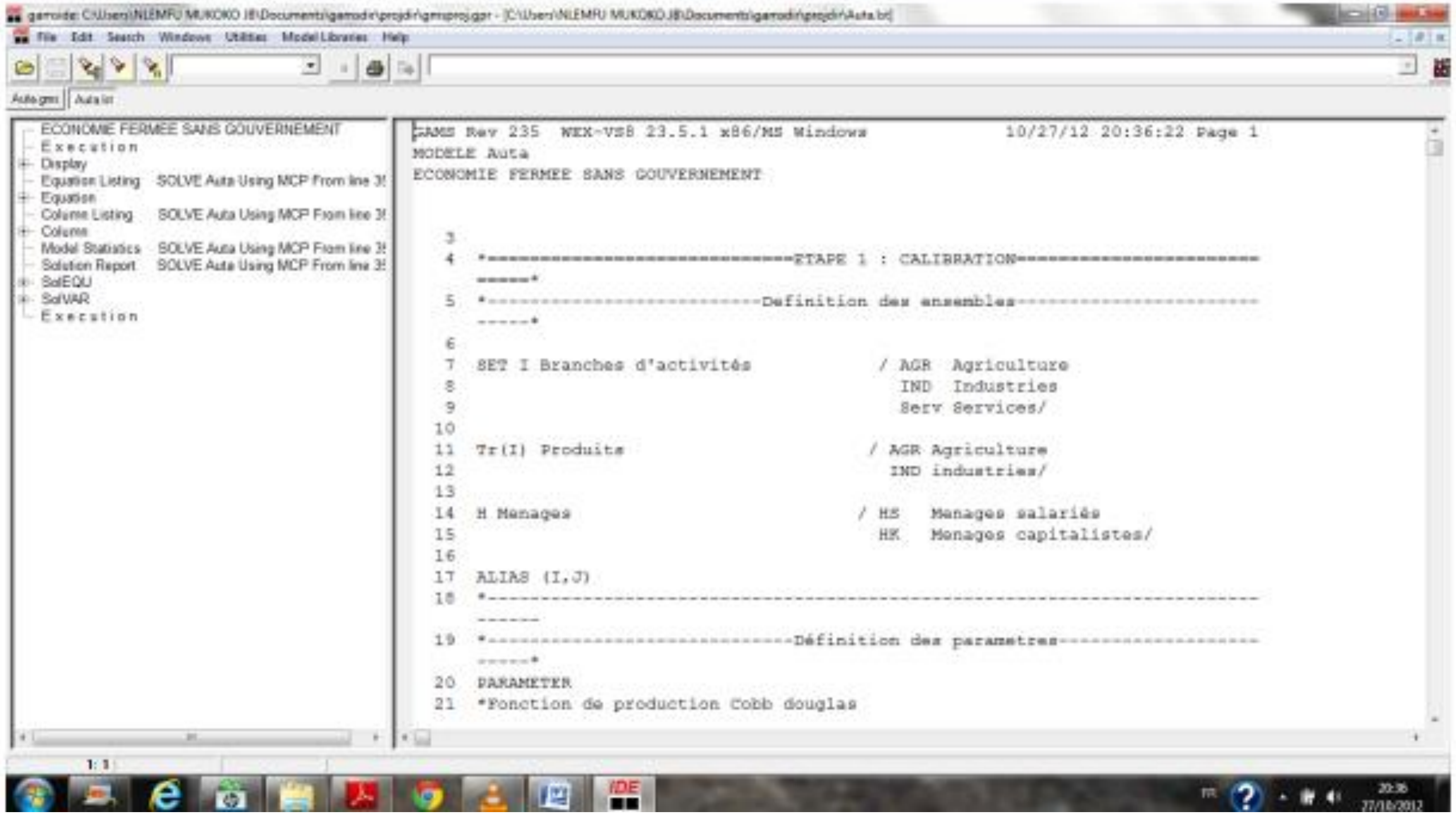




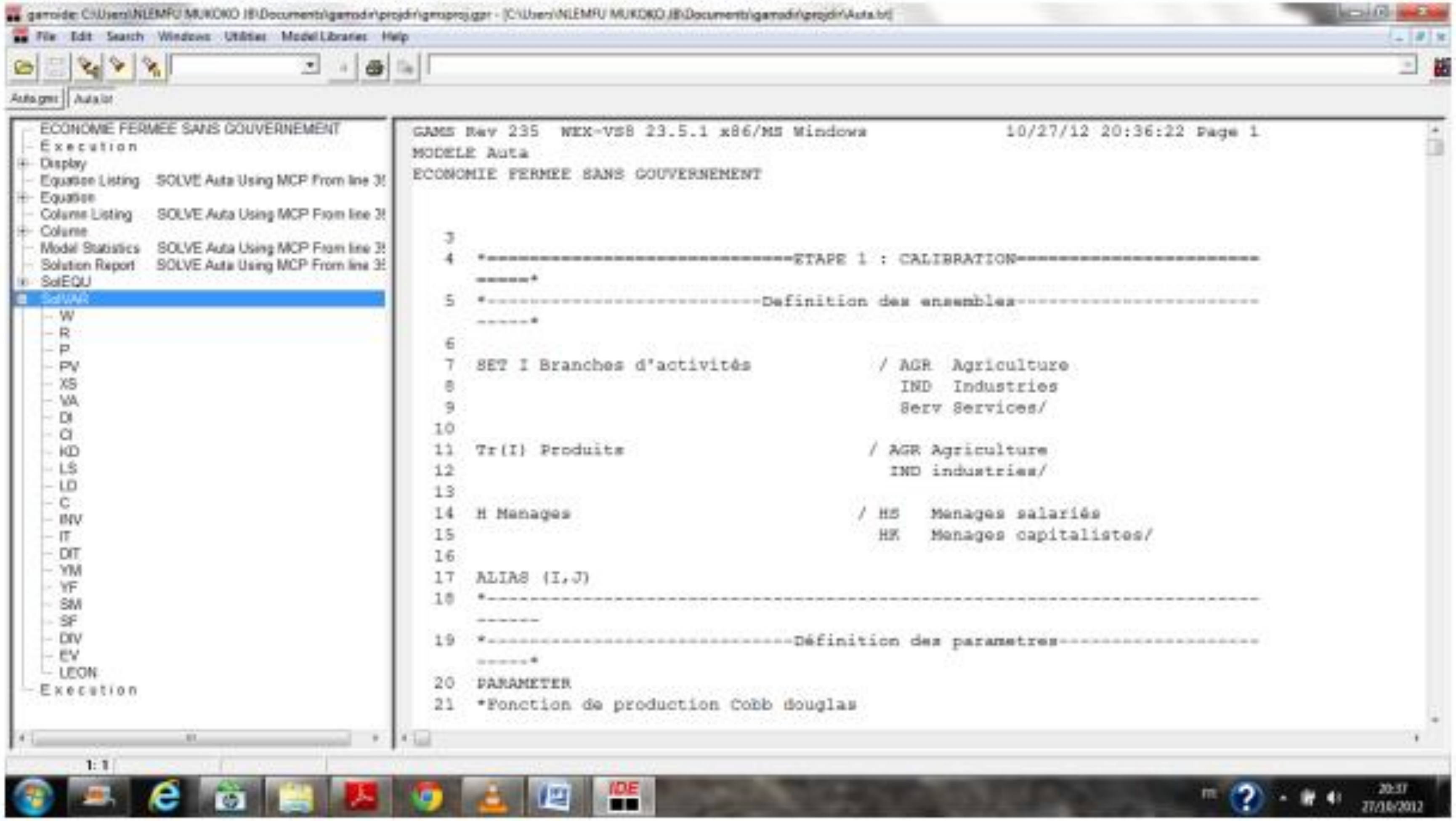
- To prove the model is running without errors, bring your attention to the window to the right of your screen “No active process” and the following message will appear: <<status: Normal Completion>>. In case of errors, you will have the following appear in red as shown below and the message <<status: Normal completion>> will not appear:



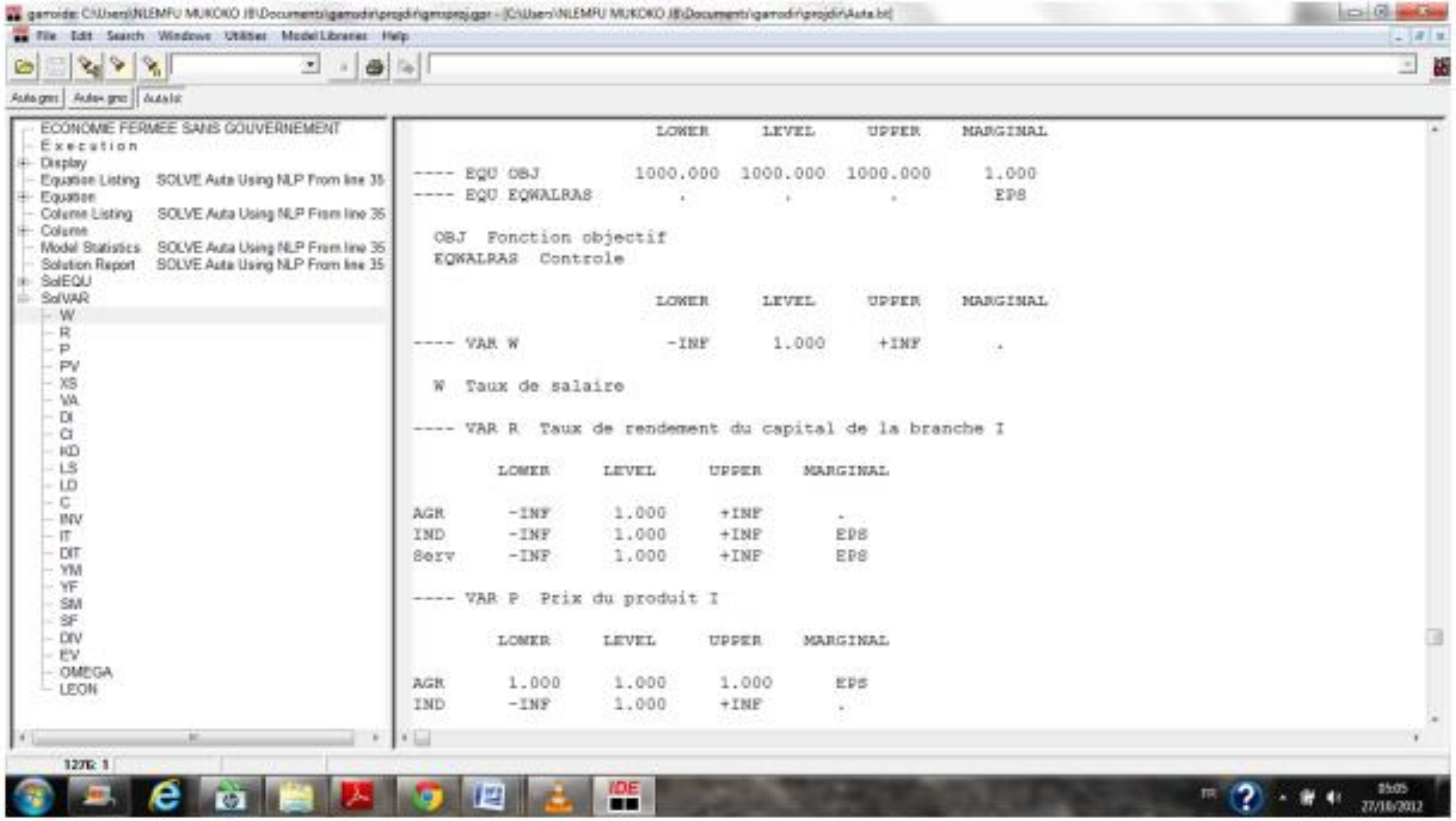
If the model functions correctly and the message <<Status; Normal completion appears>> appears, the next question is how to interpret the results of our programing? It suffices to look at the upper left corner of your screen, next to the name of the file <<Auta.gms>>. There, you will notice a file with the same name but with a different extension <<Auta.Lst>>. There you will find the gams results. Simply click on it and you will have the following appear:



To view the results click on **SolVAR**. You will have the different results by variables

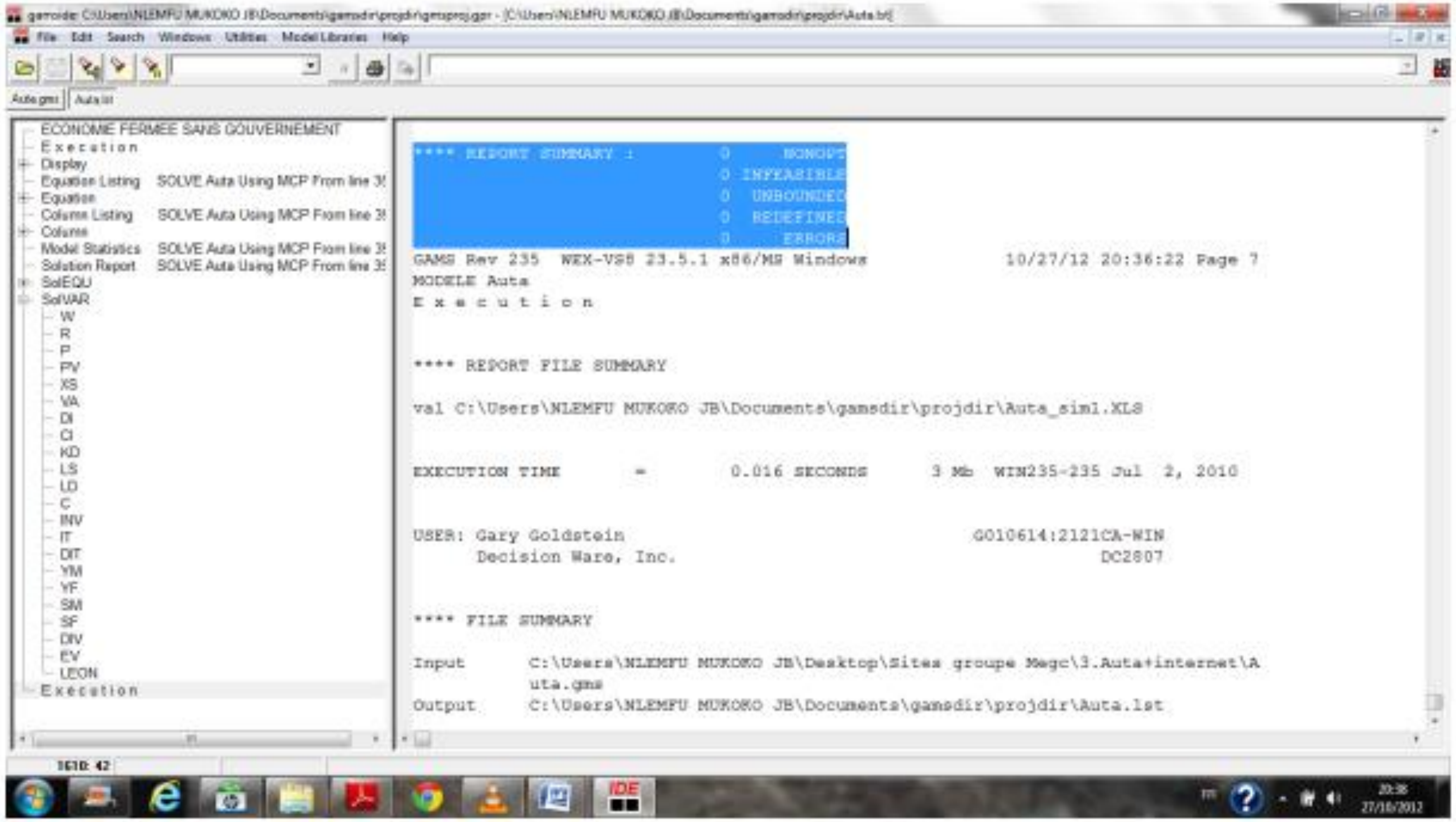


- It is sufficient to click on the variable to view its result

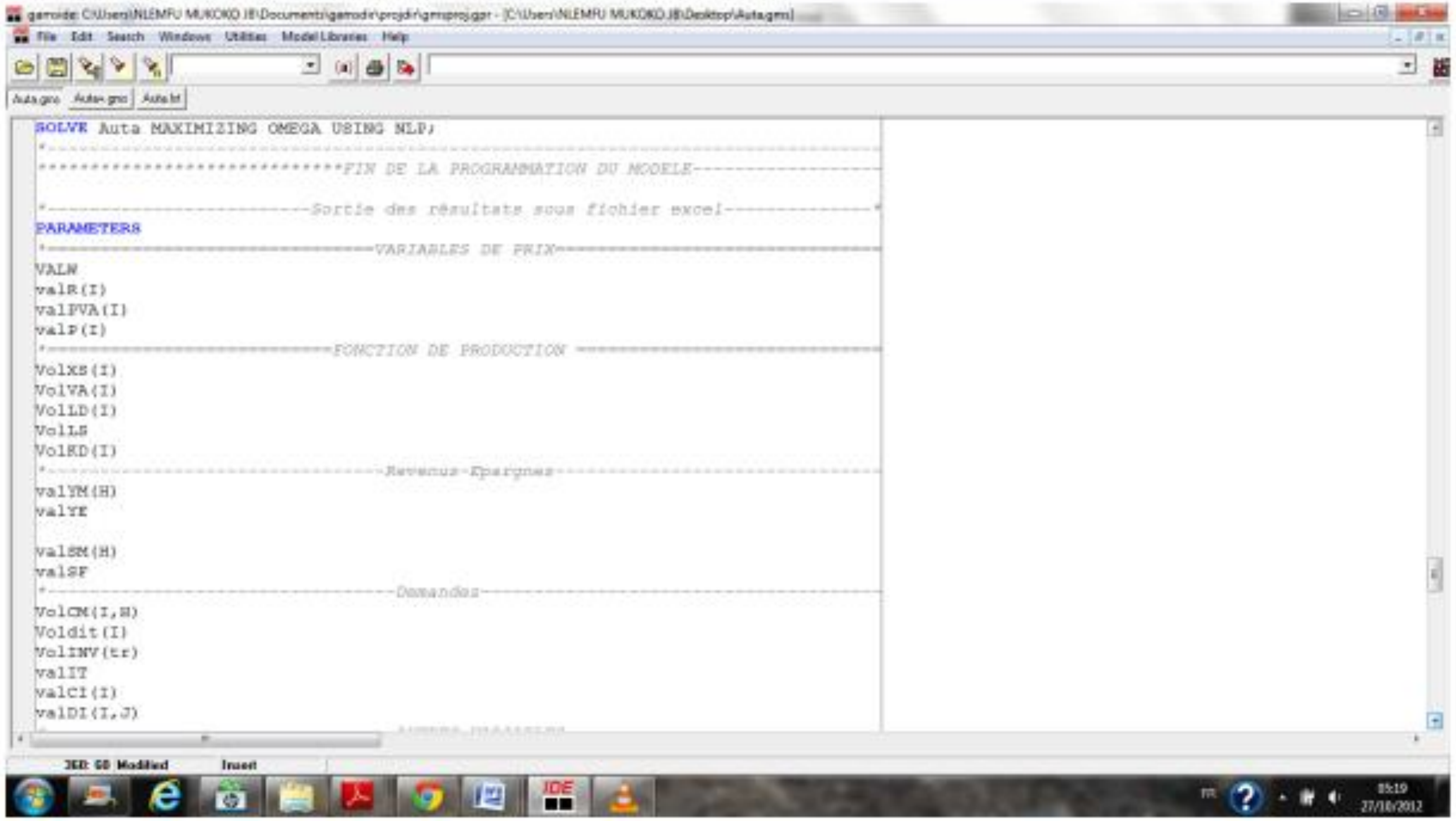


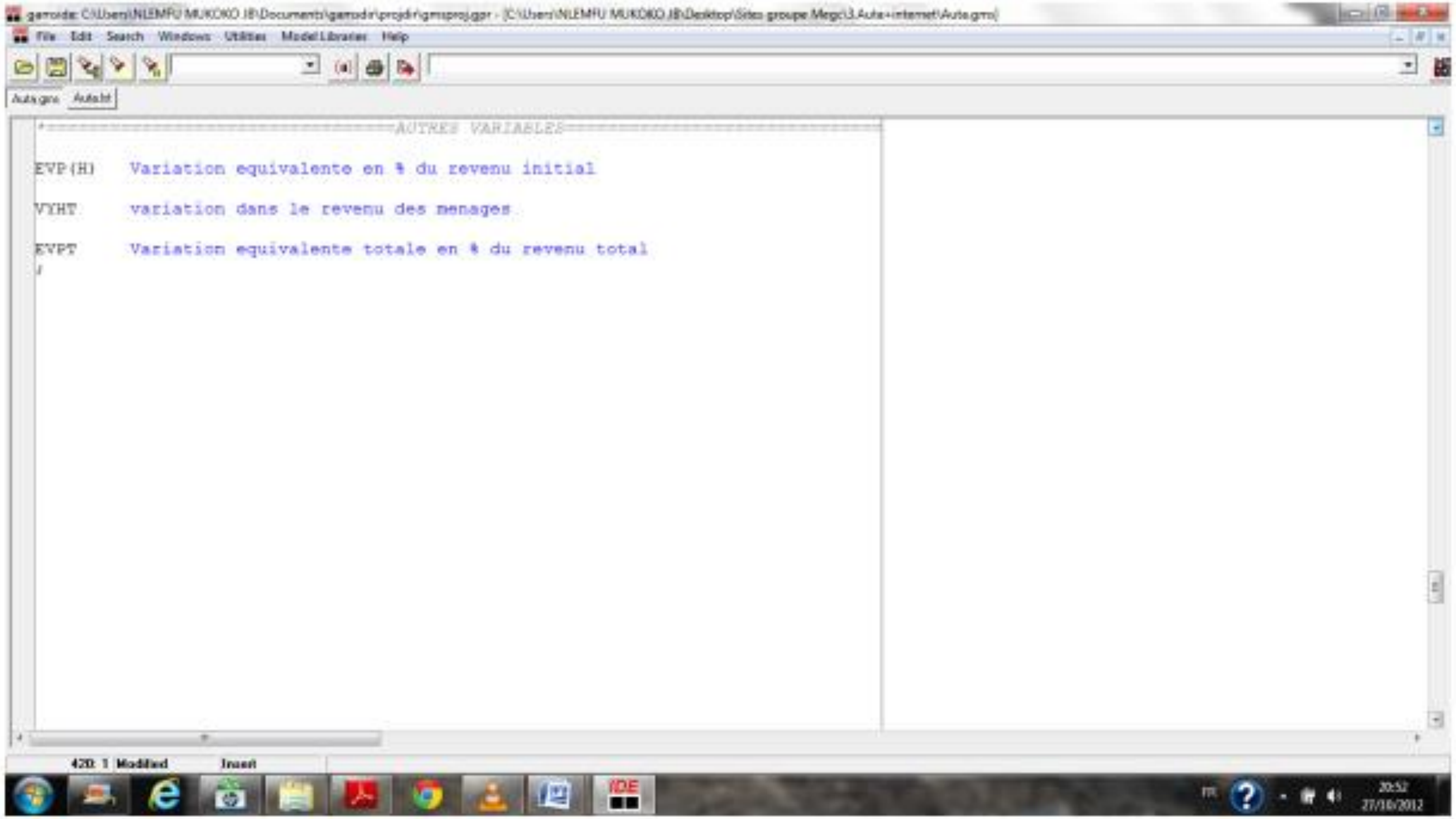
- You will notice that the information introduced at the first step were reinstituted by the model after the resolution. Verify all variables by the same procedure. If it is the case, the model is well calibrated, that is to say the model is good and it is ready for simulations

- An alternative way of verifying the model is well calibrated is by clicking on "Execution". If you it is calibrate you will see the following appear: Bring your attention to the **REPORT SUMMARY:** 0 NONOPT ; 0 INFEASIBLE; 0 UNBOUNDED and 0 ERRORS. IF IT'S THE CASE. If it is the case, the model is well calibrated, there are no errors/ non optimal solutions. You are ready to start the simulations

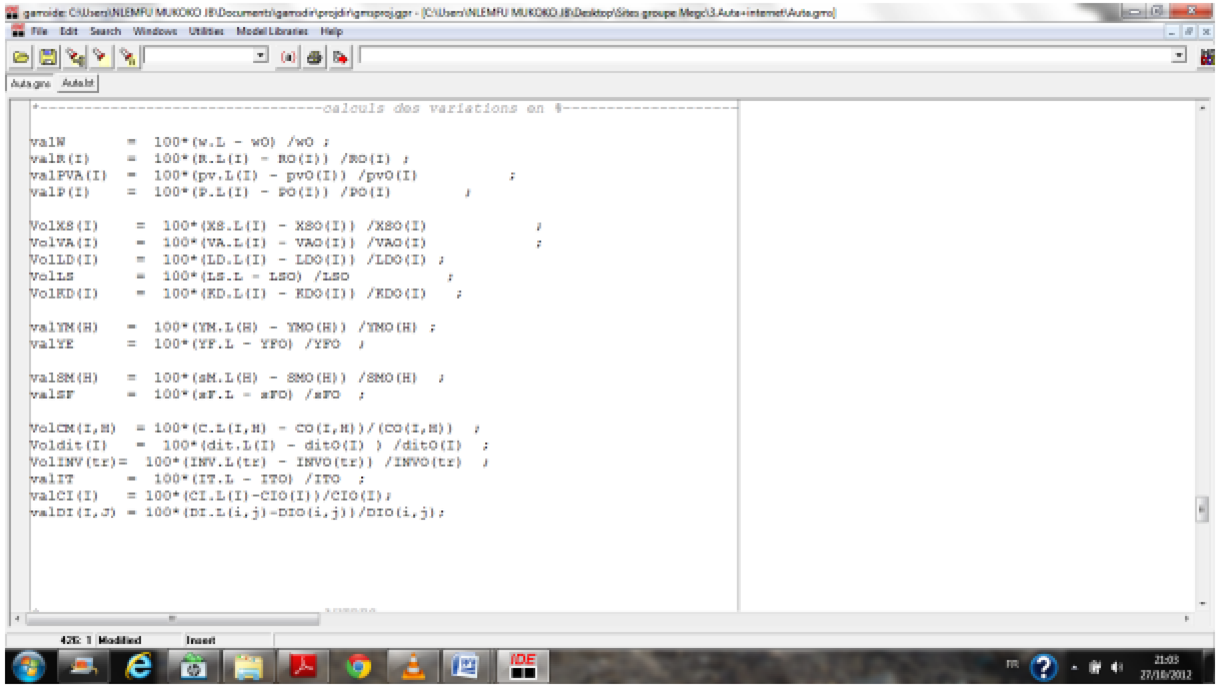


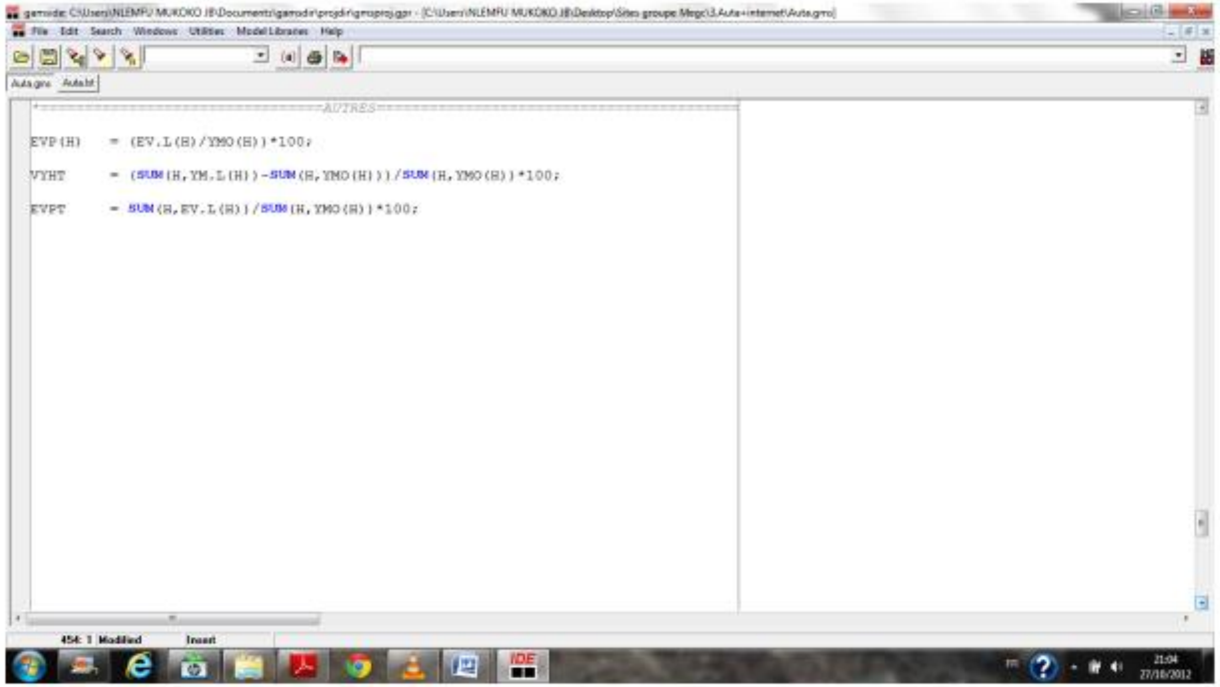
- Notice it is not always easy to read the results on the file **lst**
- An alternative way of reading the results of the model is to communicate the GAMS software to Excel table for an output sheet of the results in the form of an Excel sheet. In this effect, the following following procedure is important:
- Declare the variables in variation



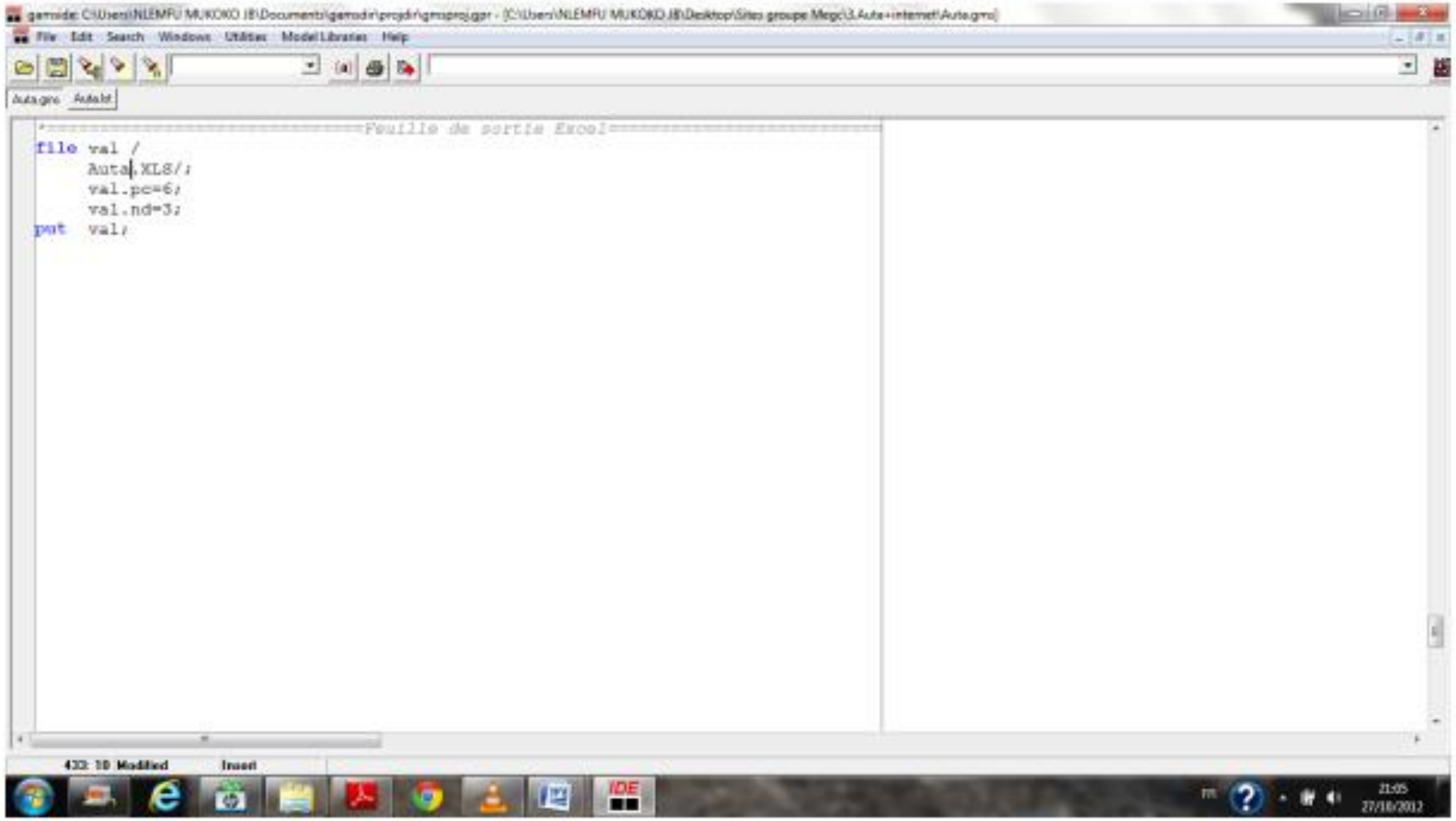

*===============================AUTRES VARIABLES===============================
EVP(H)   Variation equivalente en % du revenu initial
VYHT   variation dans le revenu des menages
EVPT   Variation equivalente totale en % du revenu total
File Edit Search Windows Utilities Model Libraries Help
Auto.gms Auto.lst
Modified
Insert

Calculation of the variations in percentage





- Creating the output sheet of the results



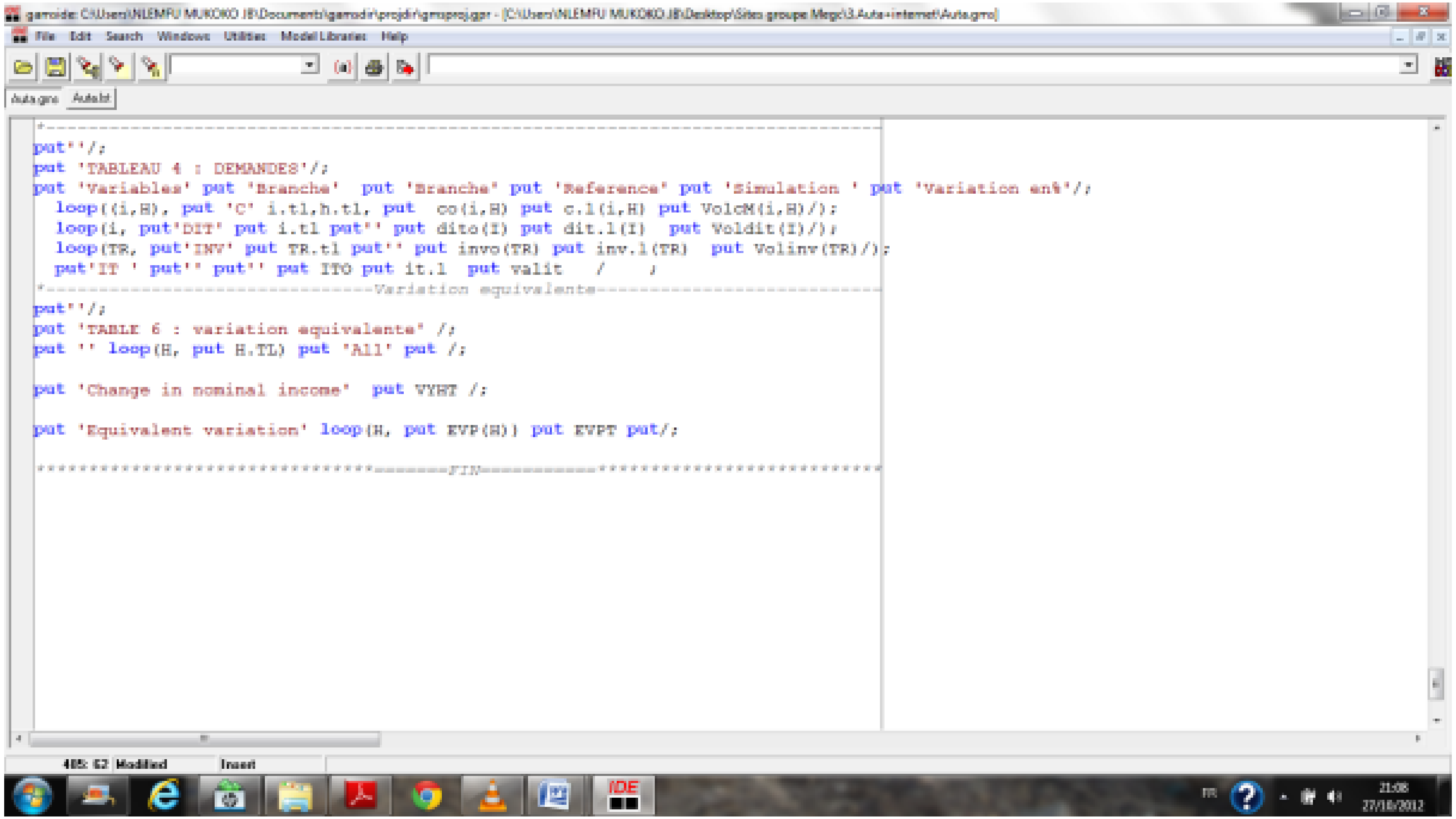
FILE Val/
Auta.xls/;
Val.pc=6;
Val.nd=4;
Put val;

- Creating the tables of the results

```
*-----------------------------------------------------------------
put 'MODELE Auta : Modèle à economie fermee sans Gouvernement'/;
put ''/;
put 'TABLEAU 1 : LES PRIX '/;
put 'Variables' put 'Branche'  put 'Branche' put 'Reference' put 'Simulation ' put 'Variation en%'/;
  put'w' put ' ' put'' put wo put W.l  put valw  / ;
  loop(i, put'r'   put i.tl put'' put ro(I) put r.l(I)  put valr(I)/)    ;
  loop(i, put'Pv'   put i.tl put'' put pvo(i) put pv.l(i)  put valpva(I)/)  ;
  loop(i, put'P'  put i.tl put'' put po(i) put p.l(i)  put valp(i)   /)  ;
*-----------------------------------------------------------------
put''/;
put 'TABLEAU 2 : LA PRODUCTION'/;
put 'Variables' put 'Branche'  put 'Branche' put 'Reference' put 'Simulation ' put 'Variation en%'/;
  loop(i, put'Xs'  put i.tl put'' put xso(i) put xs.l(i)  put Volxs(i)   /)  ;
  loop(i, put'Va'  put i.tl put'' put Vao(i) put Va.l(i)  put Volva(i)   /)  ;
  loop(i, put'Ld'  put i.tl put'' put ldo(i) put ld.l(i)  put Volld(i)   /)  ;
  put'LS ' put ' ' put'' put LSO put ls.l  put Volls    /    ;
  loop(i, put'KD'  put i.tl put'' put kdo(I) put kd.l(I)  put Volkd(I)/)  ;
  loop(i, put'CI'  put i.tl put'' put CIO(i) put CI.l(i)  put valCI(i)/)  ;
loop((i,j), put 'DI' i.tl,j.tl, put DIO(i,j) put DI.l(i,j) put valDI(i,j) /);

*-----------------------------------------------------------------
put''/;
put 'TABLEAU 3 : REVENUS ET EPARGNES'/;
put 'Variables' put 'Branche'  put 'Branche' put 'Reference' put 'Simulation ' put 'Variation en%'/;

  loop(h, put'YM'   put h.tl put'' put YMO(h) put YM.l(h)  put valYM(h)   /)  ;
  put'YF ' put ' ' put'' put YFO  put YF.l  put valYE    /    ;
  loop(h, put'SM'  put h.tl put'' put SMO(h) put SM.l(h)  put valsm(h)   /)  ;
  put'SF ' put ' ' put'' put sFo put sF.l  put ValSF    /    ;
```

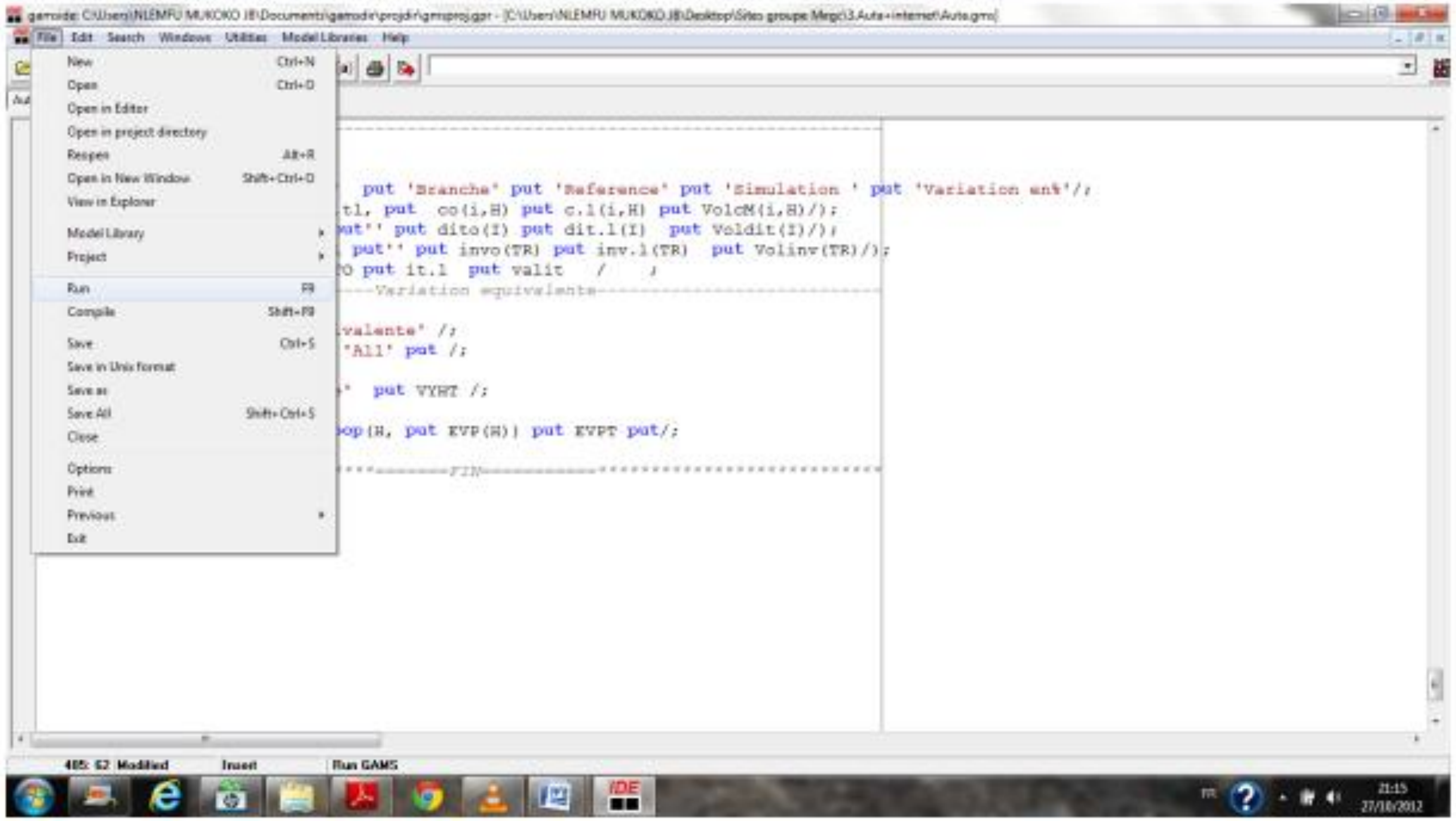


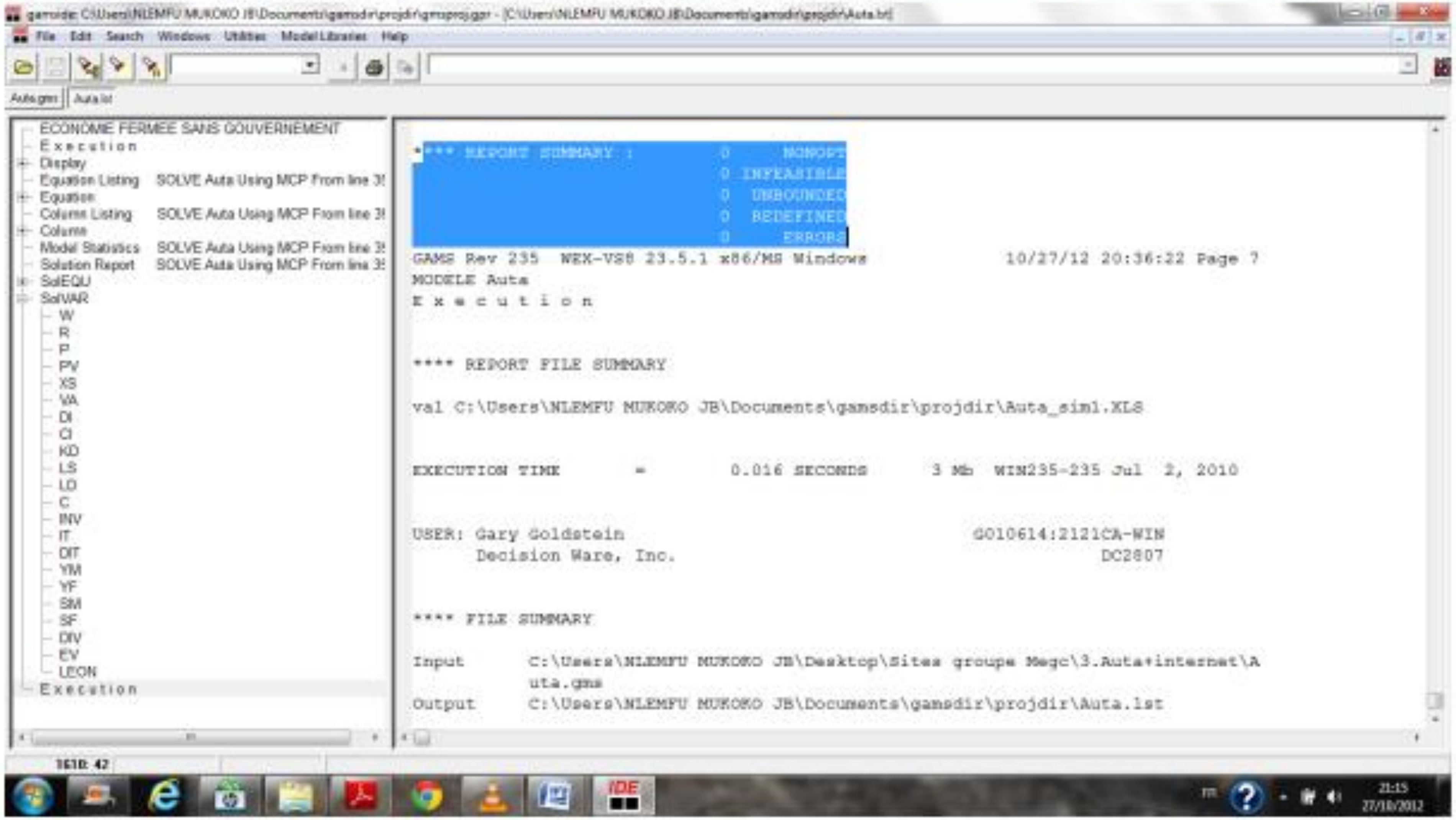
gamside: C:\Users\NLEMFU MUKOKO JB\Documents\gamsdir\projdir\gmsproj.gpr - [C:\Users\NLEMFU MUKOKO JB\Desktop\Sites groupe Mega\3.Auta+internet\Auta.gms]
File Edit Search Windows Utilities Model Libraries Help
Auta.gms Auta.lst
*---
put''/;
put 'TABLEAU 4 : DEMANDES'/;
put 'Variables' put 'Branche' put 'Branche' put 'Reference' put 'Simulation ' put 'Variation en%'/;
loop((i,H), put 'C' i.tl,h.tl, put co(i,H) put c.l(i,H) put VolcM(i,H)/);
loop(i, put'DIT' put i.tl put'' put dito(I) put dit.l(I) put Voldit(I)/);
loop(TR, put'INV' put TR.tl put'' put invo(TR) put inv.l(TR) put Volinv(TR)/);
put'IT ' put'' put'' put ITO put it.l put valit / ;
*-------------------------------Variation equivalente---------------------------
put''/;
put 'TABLE 6 : variation equivalente' /;
put '' loop(H, put H.TL) put 'All' put /;
put 'Change in nominal income' put VYHT /;
put 'Equivalent variation' loop(H, put EVP(H)) put EVPT put/;
********************************=======FIN===========***************************
405: 62 Modified Insert
21:08
27/10/2012

- Thus, we have finished the programing of our model
- To solve the model, follow the same procedure as before, as in:

File/Run or F9

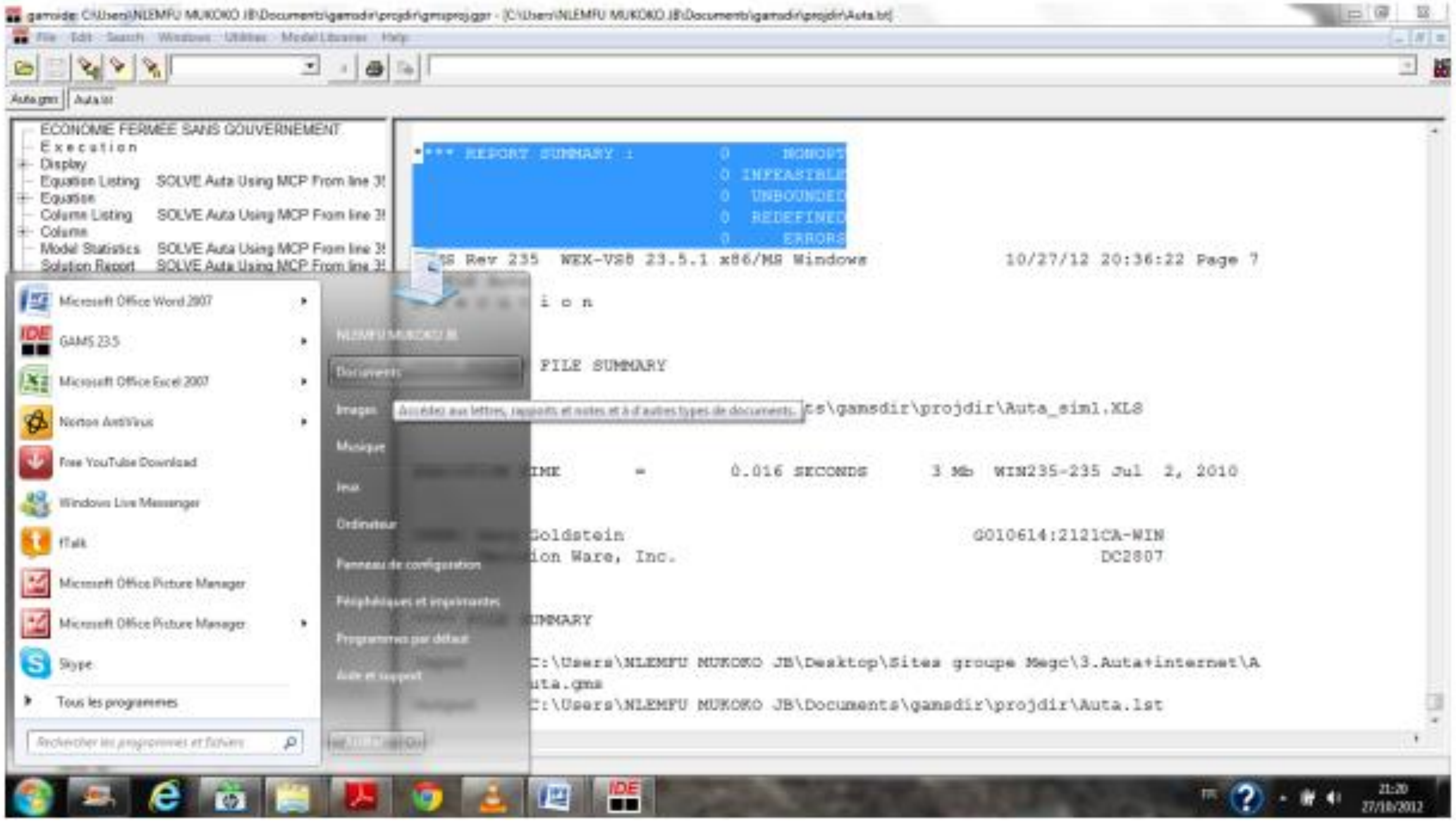
- **Apply the same procedures to verify if “the model ran”**

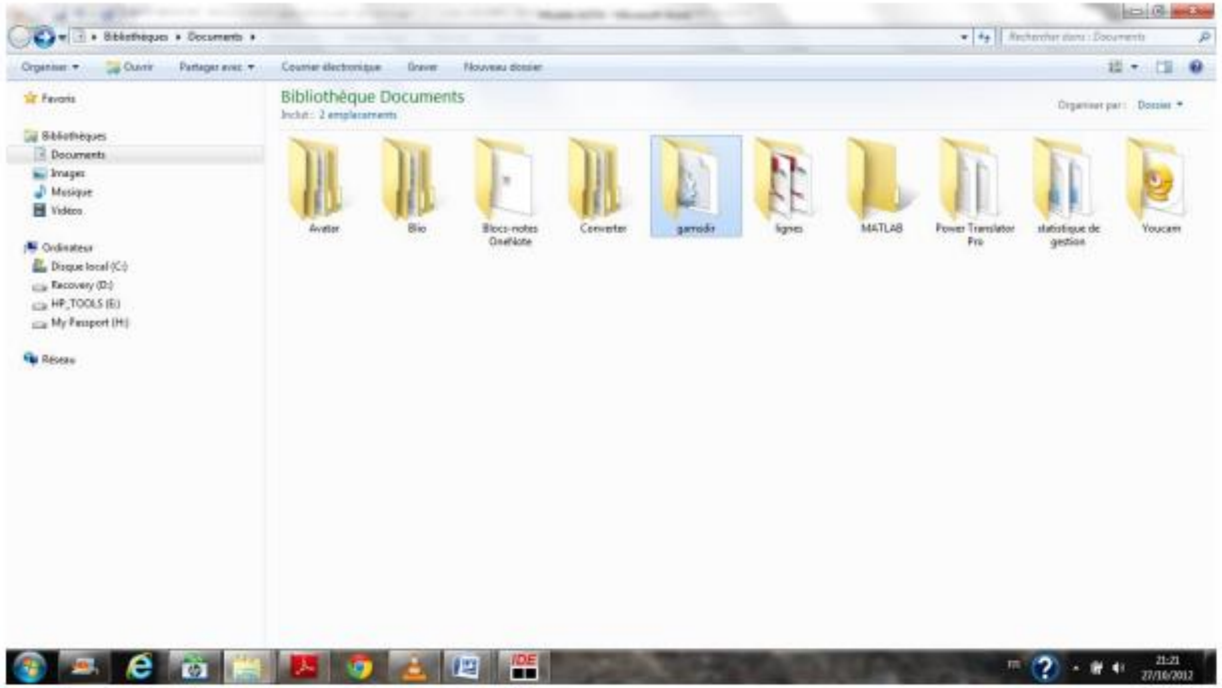


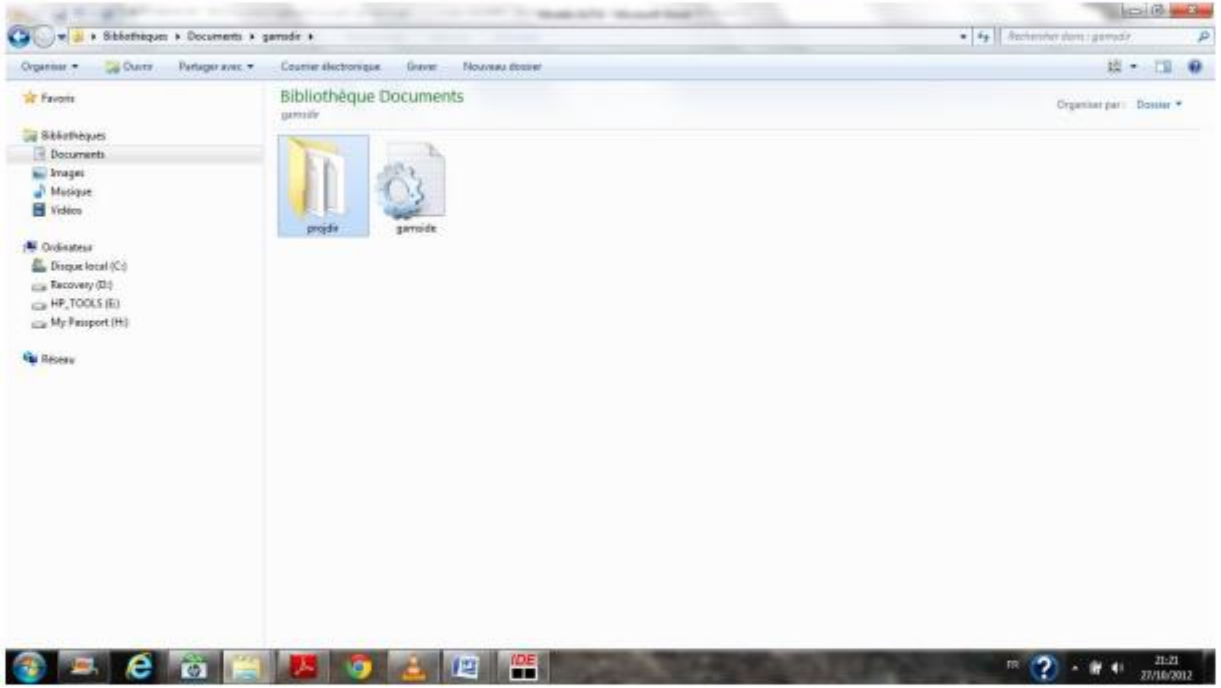

File Edit Search Windows Utilities Model Libraries Help
Auta.gms
Auta.lst
ECONOMIE FERMEE SANS GOUVERNEMENT
Execution
Display
Equation Listing SOLVE Auta Using MCP From line 3
Equation
Column Listing SOLVE Auta Using MCP From line 3
Column
Model Statistics SOLVE Auta Using MCP From line 3
Solution Report SOLVE Auta Using MCP From line 3
SolEQU
SolVAR
W
R
P
PV
XS
VA
DI
CI
KD
LS
LD
C
INV
IT
DIT
YM
YF
SM
SF
DIV
EV
LEON
Execution
**** REPORT SUMMARY : 0 NONOPT
0 INFEASIBLE
0 UNBOUNDED
0 REDEFINED
0 ERRORS
GAMS Rev 235 WEX-VS8 23.5.1 x86/MS Windows 10/27/12 20:36:22 Page 7
MODELE Auta
E x e c u t i o n
**** REPORT FILE SUMMARY
val C:\Users\NLEMFU MUKOKO JB\Documents\gamsdir\projdir\Auta_sim1.XLS
EXECUTION TIME = 0.016 SECONDS 3 Mb WIN235-235 Jul 2, 2010
USER: Gary Goldstein G010614:2121CA-WIN
Decision Ware, Inc. DC2807
**** FILE SUMMARY
Input C:\Users\NLEMFU MUKOKO JB\Desktop\Sites groupe Megc\3.Auta+internet\Auta.gms
Output C:\Users\NLEMFU MUKOKO JB\Documents\gamsdir\projdir\Auta.lst
1610: 42

- We can also directly verify in the results via <<Auta.xls>>, go to:

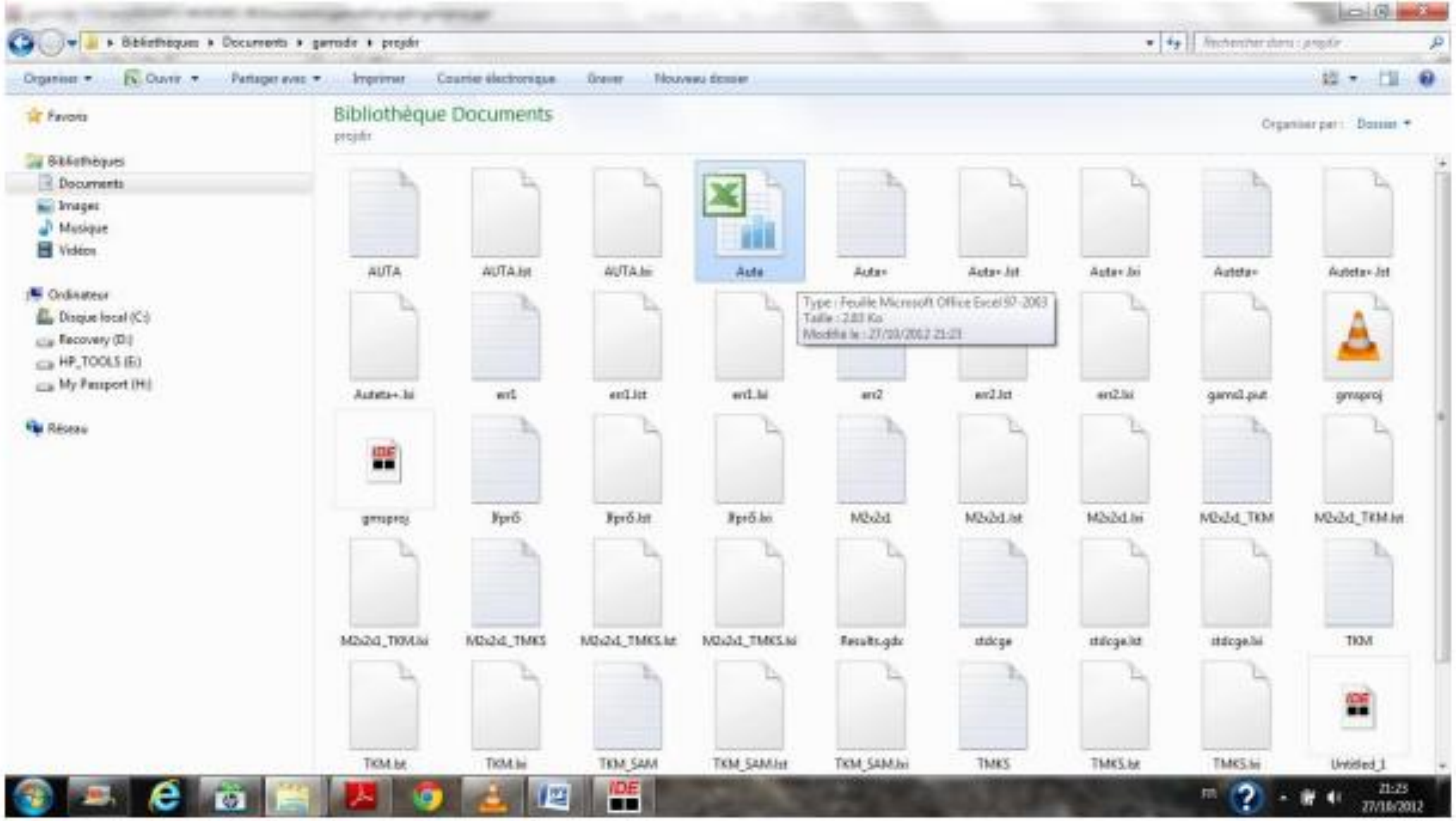
Mydocuments/Gamdir/projdir/auta.xlsx

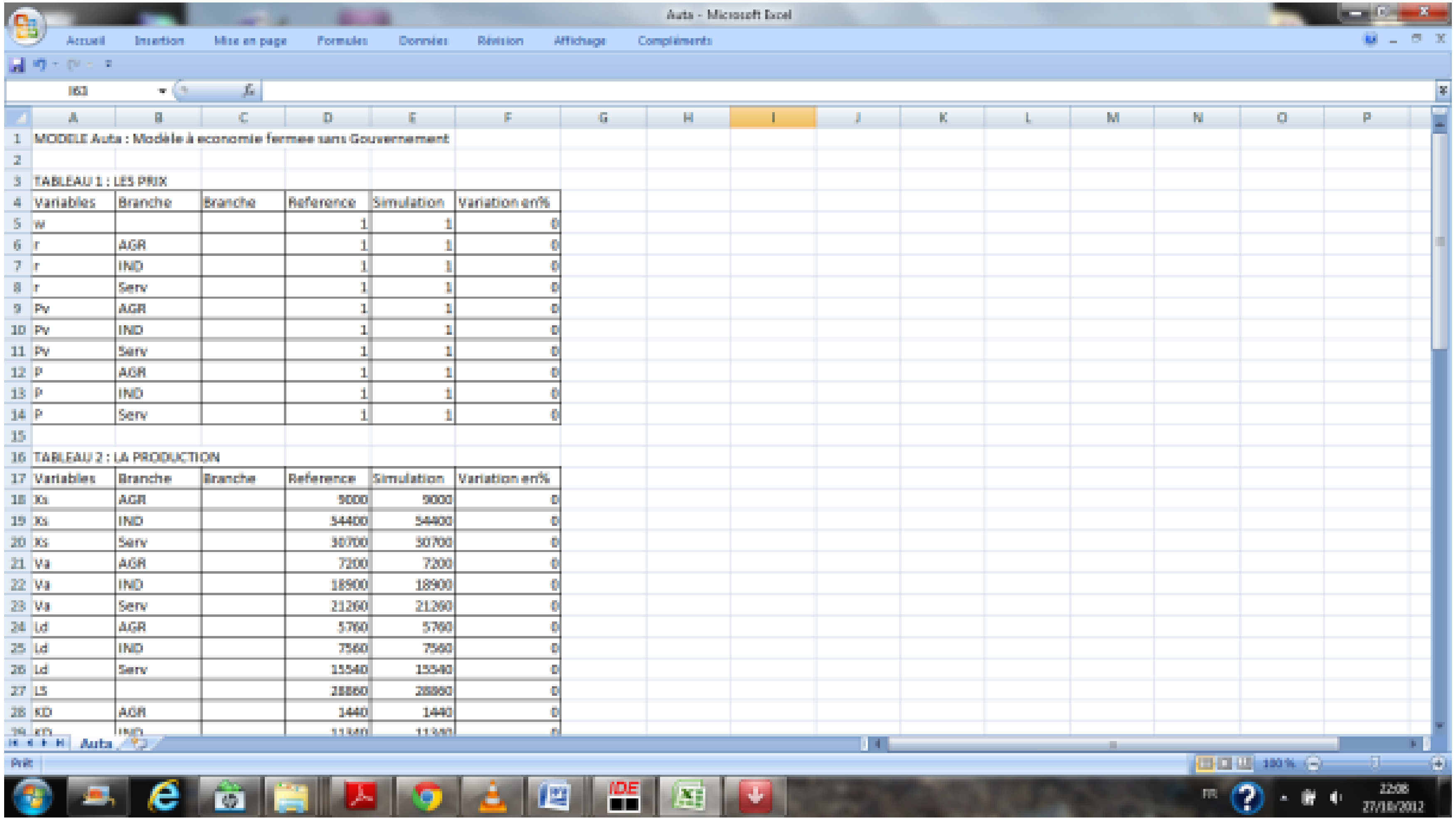



Bibliothèque Documents
Avatar
Blio
Blocs-notes OneNote
Converter
gamsdir
lignes
MATLAB
Power Translator Pro
statistique de gestion
Youcam


Bibliothèque Documents
projdir
gamside

- Click on <<Auta.xls>> and then <<yes>>





MODELE Auta : Modèle à economie fermee sans Gouvernement

TABLEAU 1 : LES PRIX

Variables	Branche	Branche	Reference	Simulation	Variation en%
w			1	1	0
r	AGR		1	1	0
r	IND		1	1	0
r	Serv		1	1	0
Pv	AGR		1	1	0
Pv	IND		1	1	0
Pv	Serv		1	1	0
P	AGR		1	1	0
P	IND		1	1	0
P	Serv		1	1	0

TABLEAU 2 : LA PRODUCTION

Variables	Branche	Branche	Reference	Simulation	Variation en%
Xs	AGR		9000	9000	0
Xs	IND		34400	34400	0
Xs	Serv		30700	30700	0
Va	AGR		7200	7200	0
Va	IND		18900	18900	0
Va	Serv		21260	21260	0
Ld	AGR		5760	5760	0
Ld	IND		7560	7560	0
Ld	Serv		15540	15540	0
LS			28860	28860	0
KD	AGR		1440	1440	0
KD	IND		11340	11340	0

Auta - Microsoft Excel

TABLEAU 4 : DEMANDES

Variables	Branche	Branche	Reference	Simulation	Variation en%
C	AGR	HS	4329	4329	0
C	AGR	HK	650	650	0
C	IND	HS	11544	11544	0
C	IND	HK	3900	3900	0
C	Serv	HS	10101	10101	0
C	Serv	HK	5850	5850	0
DIT	AGR		2922.4	2922.4	0
DIT	IND		29068.6	29068.6	0
DIT	Serv		14749	14749	0
INV	AGR		1098.6	1098.6	0
INV	IND		9887.4	9887.4	0
IT			10986	10986	0

TABLE 6 : variation equivalente

	HS	HK	All
Change in ne	0		
Equivalent v	0	0	0

PROGRAMME PAR
BLAISE NLEMFU
blaise_nlemfu@yahoo.fr
octobre 2012

- Viewing the results, we notice that the values of the variables introduced with the entry of data (see reference column) were reinstituted (see simulations column) and the last column is only the calculation of the variation in percentage between these two columns. This variation at the last column is 0% everywhere; it proves that our model reproduced the situation of reference and that it is ready for simulations

Simulations

- We have retained two simulation plans: the first simulation (Sim 1) holds a 10% increase in the volume of labor and the second simulation (Sim 2) analyzes the case of a 10% increase in capital specific to the branch of services

Simulation 1

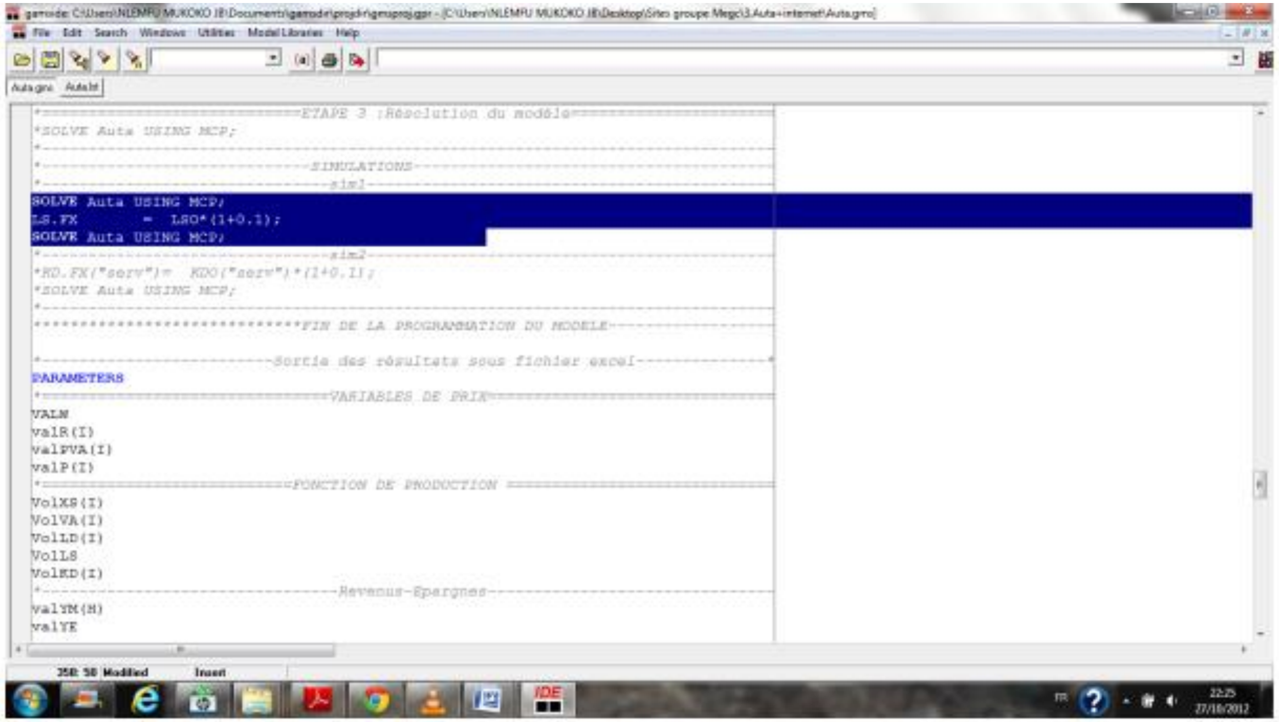
- 10% increase in labor volume.
- The concern at this level, is how to introduce this simulation in our model. As a reminder, the simulations are realized on exogenous variables as highlighted above. In the occurrence, of the case that concerns us, it's the variable labour (LS.FX).

To view the 10% increase, we will have:

Solve Auta using MCP;

LS.FX=LSO*(1+0.1);

Solve Auta using MCP;

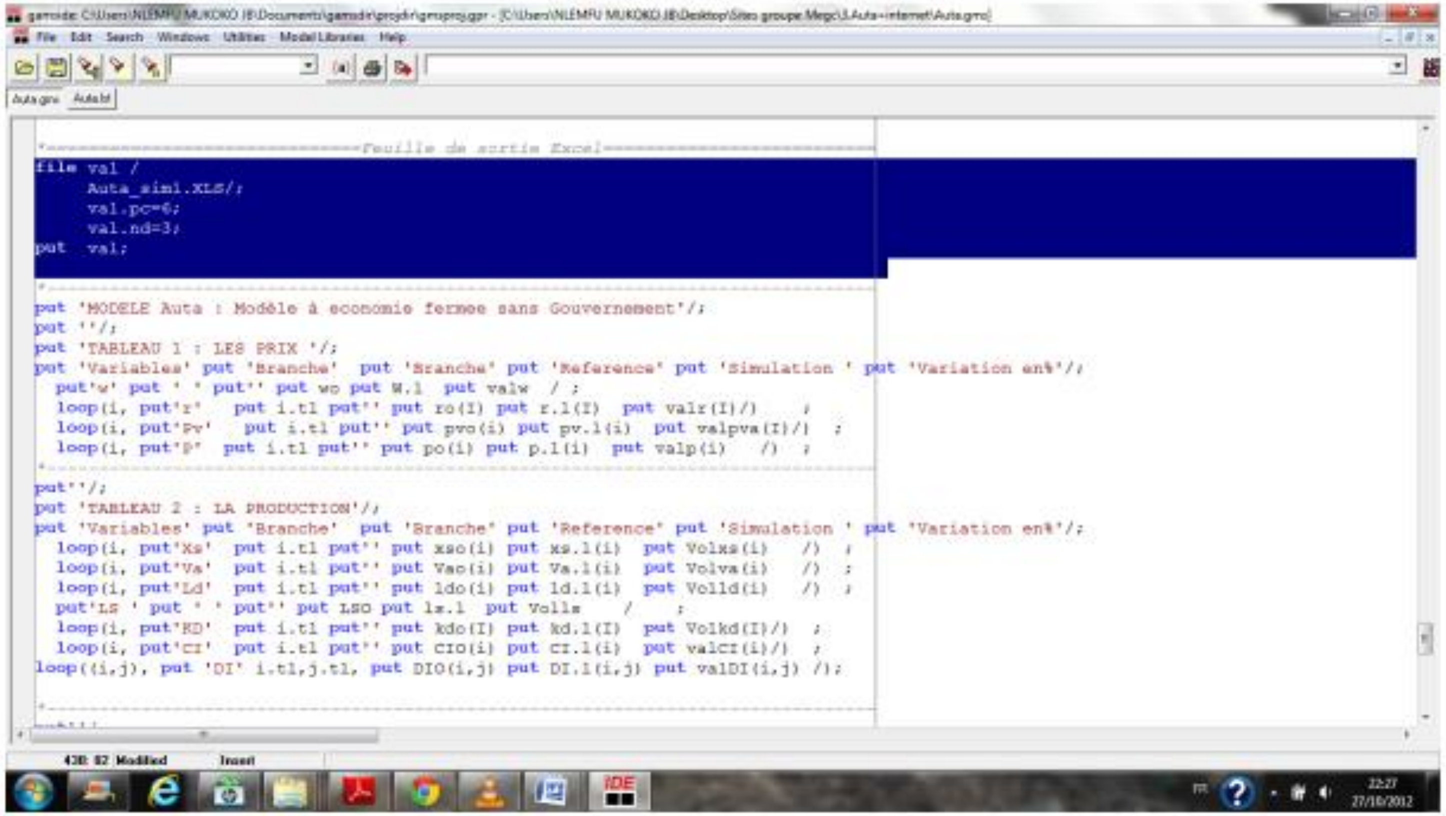


- Change the name of the output sheet on Excel from

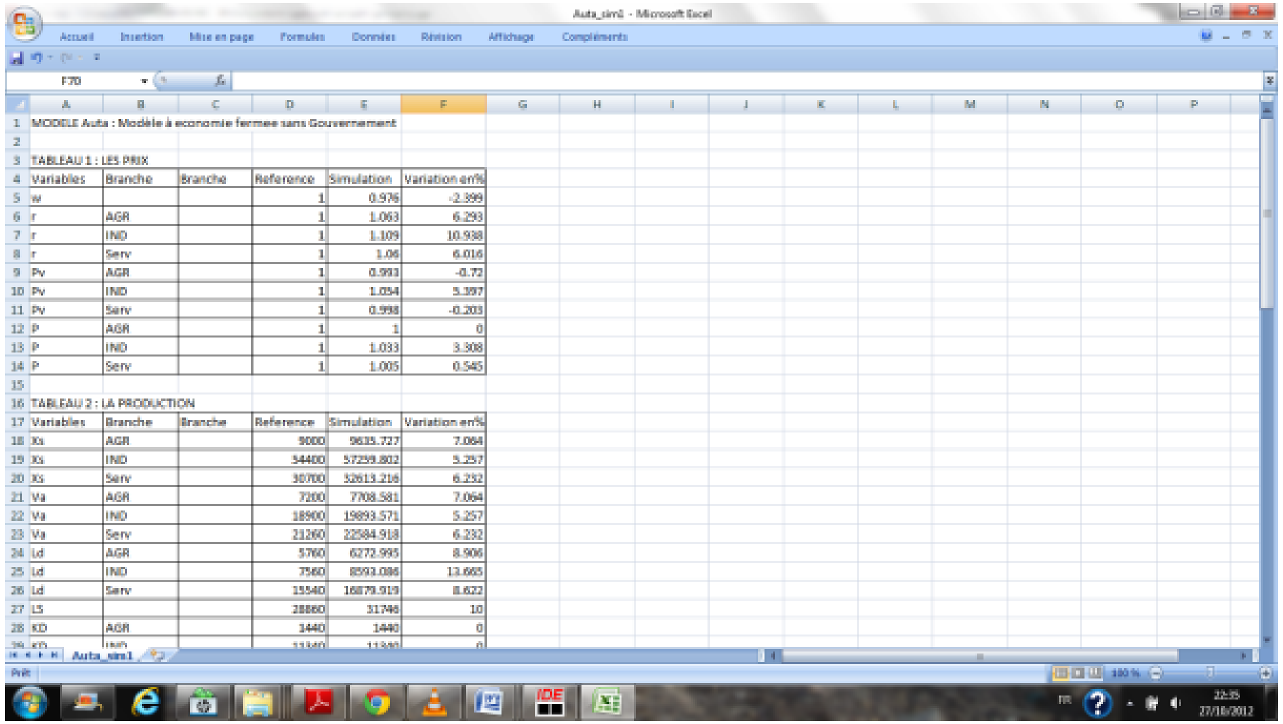
FILE Val/
Auta.xls/;
Val.pc=6
val.nd=4
put val;

To

FILE Val/
Auta_sim1.xls/;
Val.pc=6;
Val.pc=4
put val;



- Next, **File/Run or F9** to solve the model and recover the results sheet **<<Auta_sim1.xls>>** in **Documents/Gamsdir/projdir/**



MODELE Auta : Modèle à economie fermee sans Gouvernement

TABLEAU 1 : LES PRIX

Variables	Branche	Branche	Reference	Simulation	Variation en%
w			1	0.976	-2.399
r	AGR		1	1.063	6.293
r	IND		1	1.109	10.938
r	Serv		1	1.06	6.016
Pv	AGR		1	0.993	-0.72
Pv	IND		1	1.054	5.397
Pv	Serv		1	0.998	-0.203
P	AGR		1	1	0
P	IND		1	1.033	3.308
P	Serv		1	1.005	0.545

TABLEAU 2 : LA PRODUCTION

Variables	Branche	Branche	Reference	Simulation	Variation en%
Xs	AGR		9000	9635.727	7.064
Xs	IND		54400	57259.802	5.257
Xs	Serv		30700	32613.216	6.232
Va	AGR		7200	7708.581	7.064
Va	IND		18900	19893.571	5.257
Va	Serv		21260	22584.918	6.232
Ld	AGR		5760	6272.995	8.906
Ld	IND		7560	8593.086	13.665
Ld	Serv		15540	16879.919	8.622
LS			28860	31746	10
KD	AGR		1440	1440	0

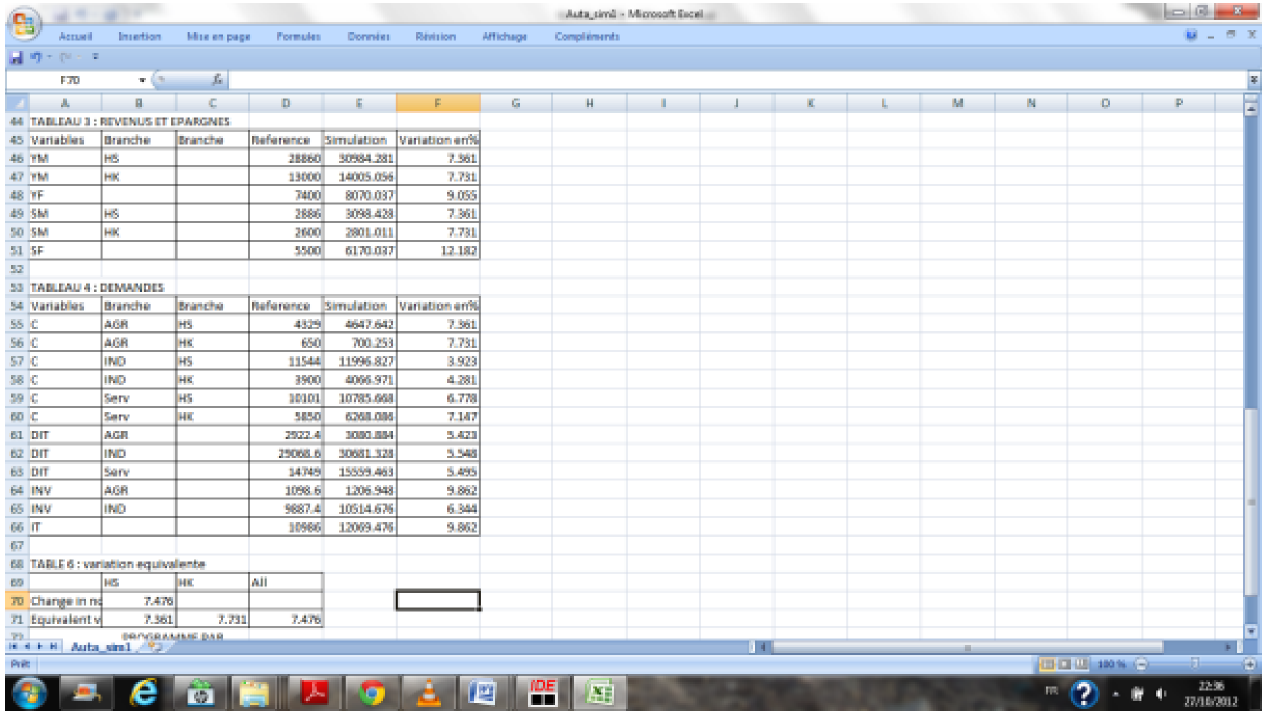


TABLEAU 3 : REVENUS ET EPARGNES

Variables	Branche	Branche	Reference	Simulation	Variation en%
YM	HS		28860	30984.281	7.361
YM	HK		13000	14005.056	7.731
YF			7400	8070.037	9.055
SM	HS		2886	3098.428	7.361
SM	HK		2600	2801.011	7.731
SF			5500	6170.037	12.182

TABLEAU 4 : DEMANDES

Variables	Branche	Branche	Reference	Simulation	Variation en%
C	AGR	HS	4329	4647.642	7.361
C	AGR	HK	650	700.253	7.731
C	IND	HS	11544	11996.827	3.923
C	IND	HK	3900	4066.971	4.281
C	Serv	HS	10101	10785.668	6.778
C	Serv	HK	5850	6268.086	7.147
DIT	AGR		2922.4	3080.884	5.423
DIT	IND		29068.6	30681.328	5.548
DIT	Serv		14749	15559.463	5.495
INV	AGR		1098.6	1206.948	9.862
INV	IND		9887.4	10514.676	6.344
IT			10986	12069.476	9.862

TABLE 6 : variation equivalente

	HS	HK	All
Change in n	7.476		
Equivalent v	7.361	7.731	7.476

As you can see at the level of the last column, the simulation had an impact on the studied economy. All that is left is to interpret the different variations that were noted

Simulation 2

- 10% increase in capital specific to the services branch.

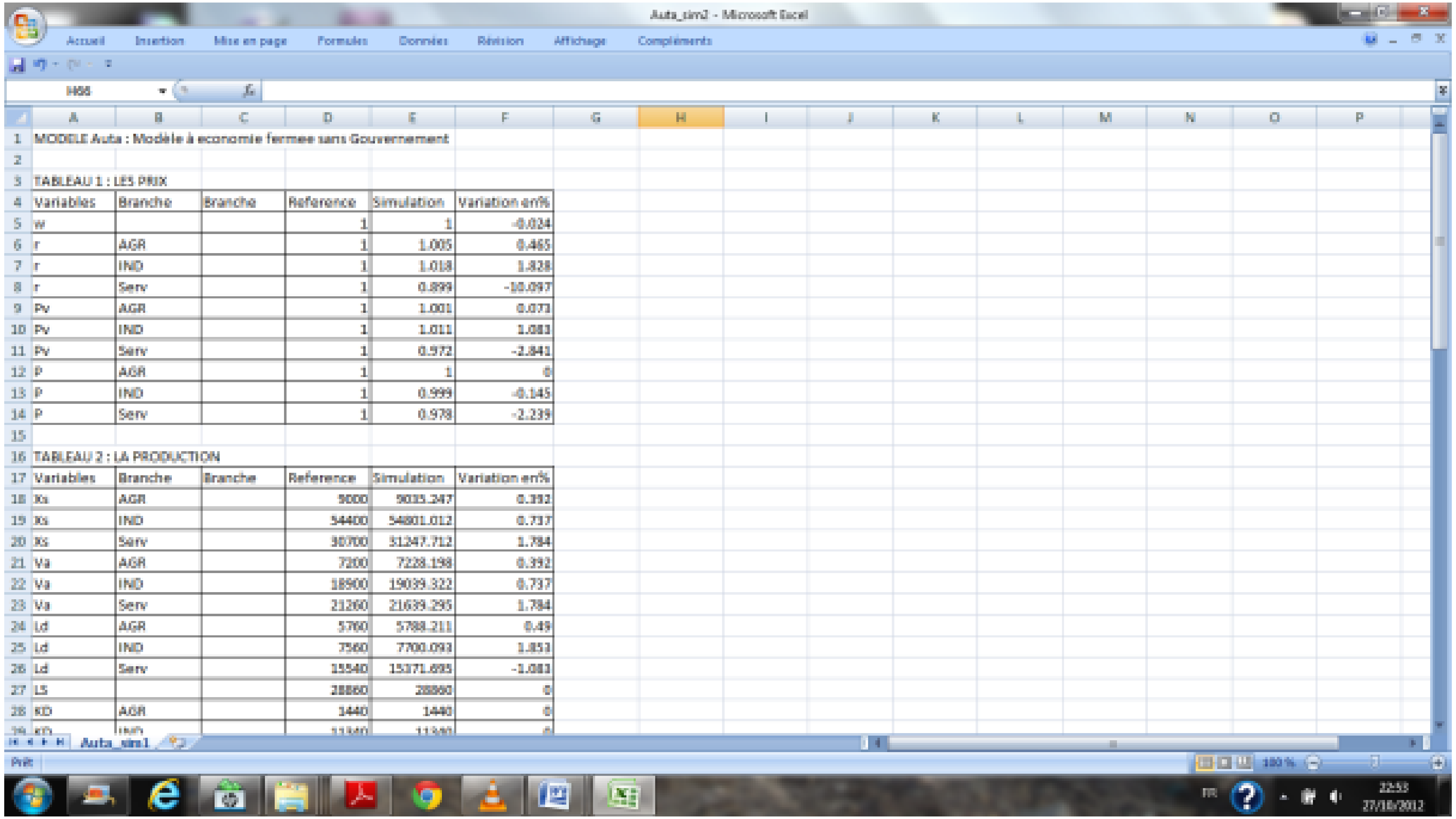
To view the 10% increase, we will:

Solve Auta using MCP
KD.FX(‘serv’)= KDO (‘serv’)*(1+0.1);
Solve Auta using MCP

- Change the name of the Excel output sheet file from:

FILE Val/		FILE VAL/
Auta.xls.xls/;		Auta_sim2.xls/;
Val.pc=6;	TO	Val.pc=6;
Val.nd=4;		Val.pc=4
put val;		put val;

- Following the same procedures as we did with simulation 1, we will obtain the results as displayed below



MODELE Auta : Modèle à economie fermee sans Gouvernement

TABLEAU 1 : LES PRIX

Variables	Branche	Branche	Reference	Simulation	Variation en%
w			1	1	-0.024
r	AGR		1	1.005	0.465
r	IND		1	1.018	1.828
r	Serv		1	0.899	-10.097
Pv	AGR		1	1.001	0.073
Pv	IND		1	1.011	1.083
Pv	Serv		1	0.972	-2.841
P	AGR		1	1	0
P	IND		1	0.999	-0.145
P	Serv		1	0.978	-2.239

TABLEAU 2 : LA PRODUCTION

Variables	Branche	Branche	Reference	Simulation	Variation en%
Xs	AGR		9000	9035.247	0.392
Xs	IND		54400	54801.012	0.737
Xs	Serv		30700	31247.712	1.784
Va	AGR		7200	7228.198	0.392
Va	IND		18900	19039.322	0.737
Va	Serv		21260	21639.295	1.784
Ld	AGR		5760	5788.211	0.49
Ld	IND		7560	7700.093	1.853
Ld	Serv		15540	15371.695	-1.083
LS			28860	28860	0
KD	AGR		1440	1440	0

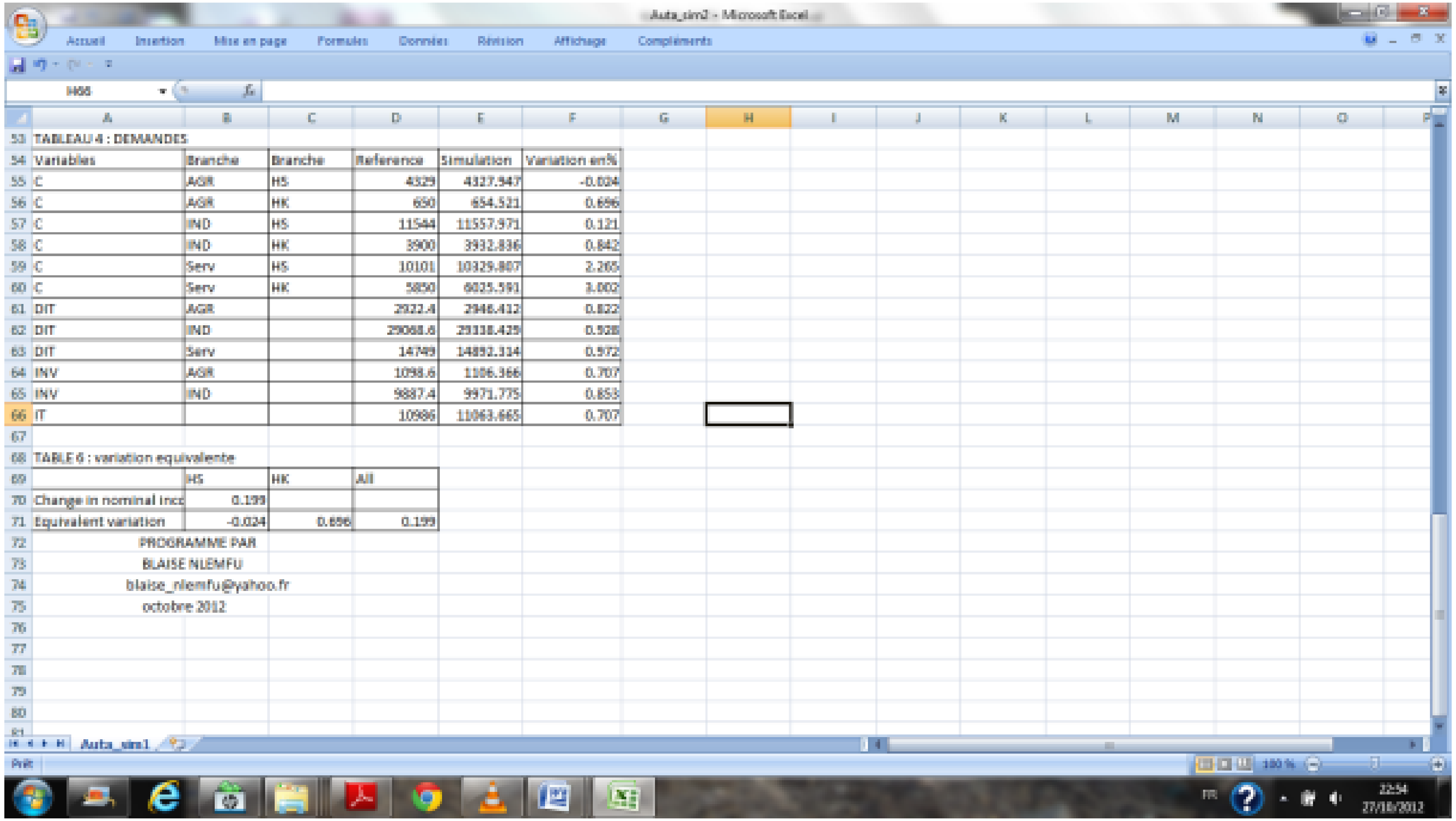


TABLEAU 4 : DEMANDES

Variables	Branche	Branche	Reference	Simulation	Variation en%
C	AGR	HS	4329	4327.947	-0.024
C	AGR	HK	650	654.521	0.696
C	IND	HS	11544	11557.971	0.121
C	IND	HK	3900	3932.836	0.842
C	Serv	HS	10101	10329.807	2.265
C	Serv	HK	5850	6025.591	3.002
DIT	AGR		2922.4	2946.412	0.822
DIT	IND		29068.6	29338.425	0.928
DIT	Serv		14749	14892.314	0.972
INV	AGR		1098.6	1106.366	0.707
INV	IND		9887.4	9971.775	0.853
IT			10986	11063.665	0.707

TABLE 6 : variation equivalente

	HS	HK	All
Change in nominal inco	0.199		
Equivalent variation	-0.024	0.696	0.199

PROGRAMME PAR
BLAISE NLEMFU
blaise_nlemfu@yahoo.fr
octobre 2012

We have the results of both our simulations, the only thing left to do is interpret them.

Interpretations

- To interpret the results of our simulations, a theoretical analysis of the probable direct and indirect (or induced) effects caused by the choc is needed. The analysis should put into evidence the dominant effects and the propagation mechanism (pinpoint the training effect) of the simulation in the model. Next, compare the results of this theoretical analysis by those found with the model, thereby drawing the consequences on the points of agreement and divergence.
- Analyze the effects of supply and demand, the mechanisms of the price formation and the origin of the differences between sector.
- Interpret the variation of price in relation to cash and other prices.

Scenario 1: 10% increase in the labor volume

- As an example, for the first simulation, we have:

The decrease in salary is considered as the indirect effect

The indirect effects (or induced) are a result of:

the decrease in salary, which would have an impact on the relative price of capital that increased (r/s); labor intensive sectors being favored because their price decreased (sectorial effect); which would induce different implications on the production sectors (**supply effect**) and household income. The latter (by combing the effects of price, of revenue even substitution), would have an impact on the demand of goods & services

Scenario 2: 10% increase in specific capital in services

- The same analysis can be done for the second simulation:

The direct effect is the decrease in return on capital in the branch of services with as a consequence the substitution of labor by capital (indirect effect) in this branch, which favors sectors like agriculture and labor intensive sectors (benefiting from the freed up labor).

Incidentally, the increase in specific capital in services has an impact on those in the two other branches (agriculture and industry), which becomes relatively rare and therefore return increases.

The combination of all these elements has implications on the formation of price, household income, as well as consumption and savings relative to investments.


YOU GOT THIS