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Christian Proaño-Acosta with the collaboration of Serhiy Yahnych

Modelling European Business Cycles (EBC Model)

A macroeconometric model of France

IMPRESSUM

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Version April 2005

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I. General Structure

- work started in 2001 with a modelling team in the department of macro analysis and forecasting
- co-operation with Prof. Wolters at the Free University of Berlin
- support of the Ministry of Finance, Berlin

Focus of the model

- Short- to medium-term forecasts of macroeconomic development in Germany and major European countries
- Analysis of different macroeconomic policies

Theory versus data based model

- The model is based using economic theory for the specifications
- No calibration
- Time series analysis and specifications of error correction models (ECM)
- Economic theory is important to specify the co-integration relationships
- Common underlying structure estimated across all economies
- Same equations are used for forecasts and for economic policy simulations

Single country versus multi country approach

- Main focus on Germany (47 stochastic equations)
- Second focus on larger EU (EMU) countries (France, Italy, Spain, (GB)) and the Netherlands (10-15 stochastic equations for each country)
- Other EMU-countries are treated as one zone (10-15 stochastic equations)
- EU (EMU) aggregates are calculated by identities
- Later on USA are modelled separately
- Non-EU (and non-US) growth and price indicators for different regions are exogenous
- Linkages via imports and exports, exchange rates and interest rates

Special modelling strategies

- Trade is disaggregated into trade with EU (EMU) countries and with non-EU countries
- Until now only adaptive expectations, backward looking, are used
- Error correction framework is used to distinguish between short term dynamics and the long run solution
- Feedback rules to stabilise the model results: Unemployment, capacity utilisation, interest rates, unit labour costs, real effective exchange rates, wealth (savings), (public deficit ratio)

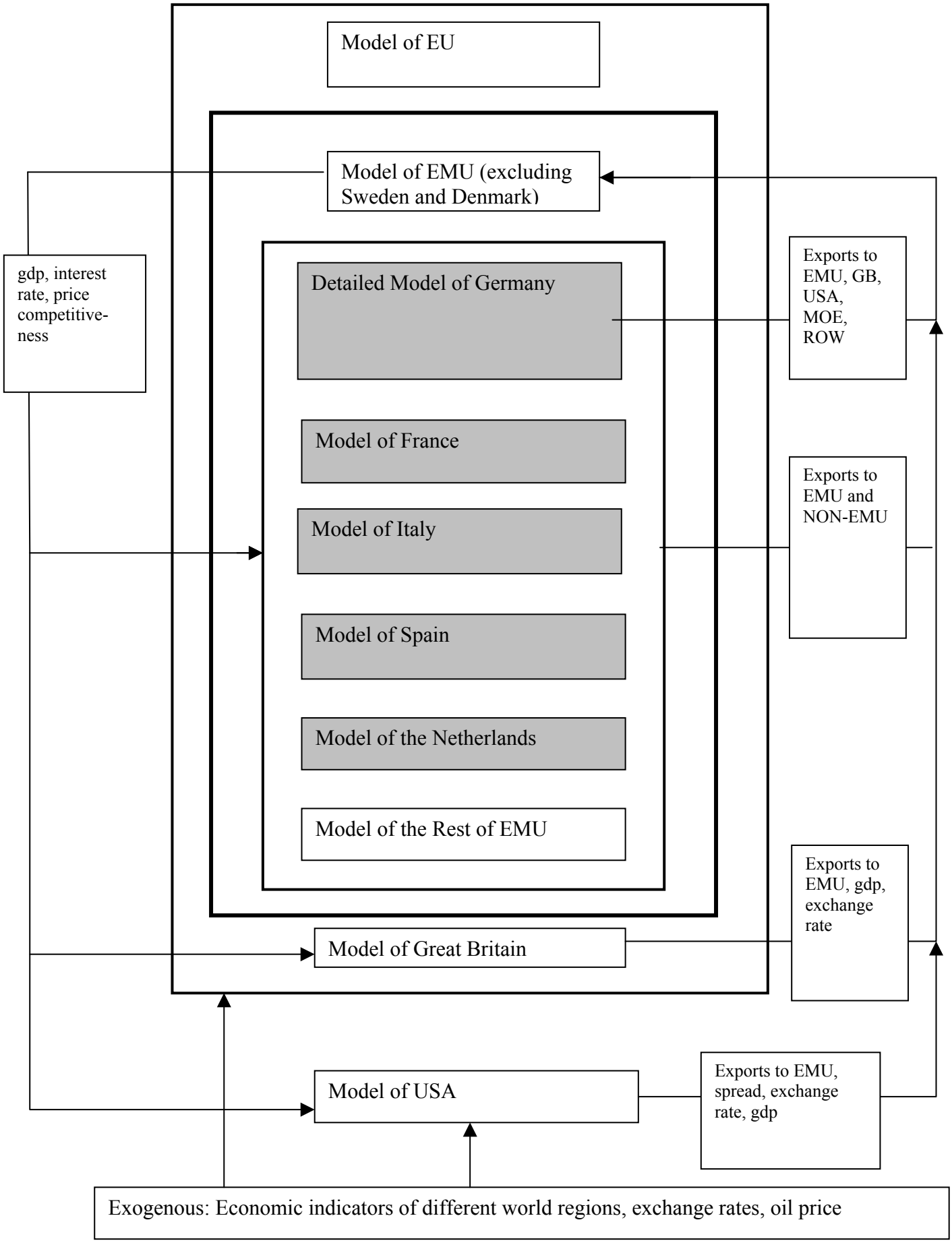
Theoretical base

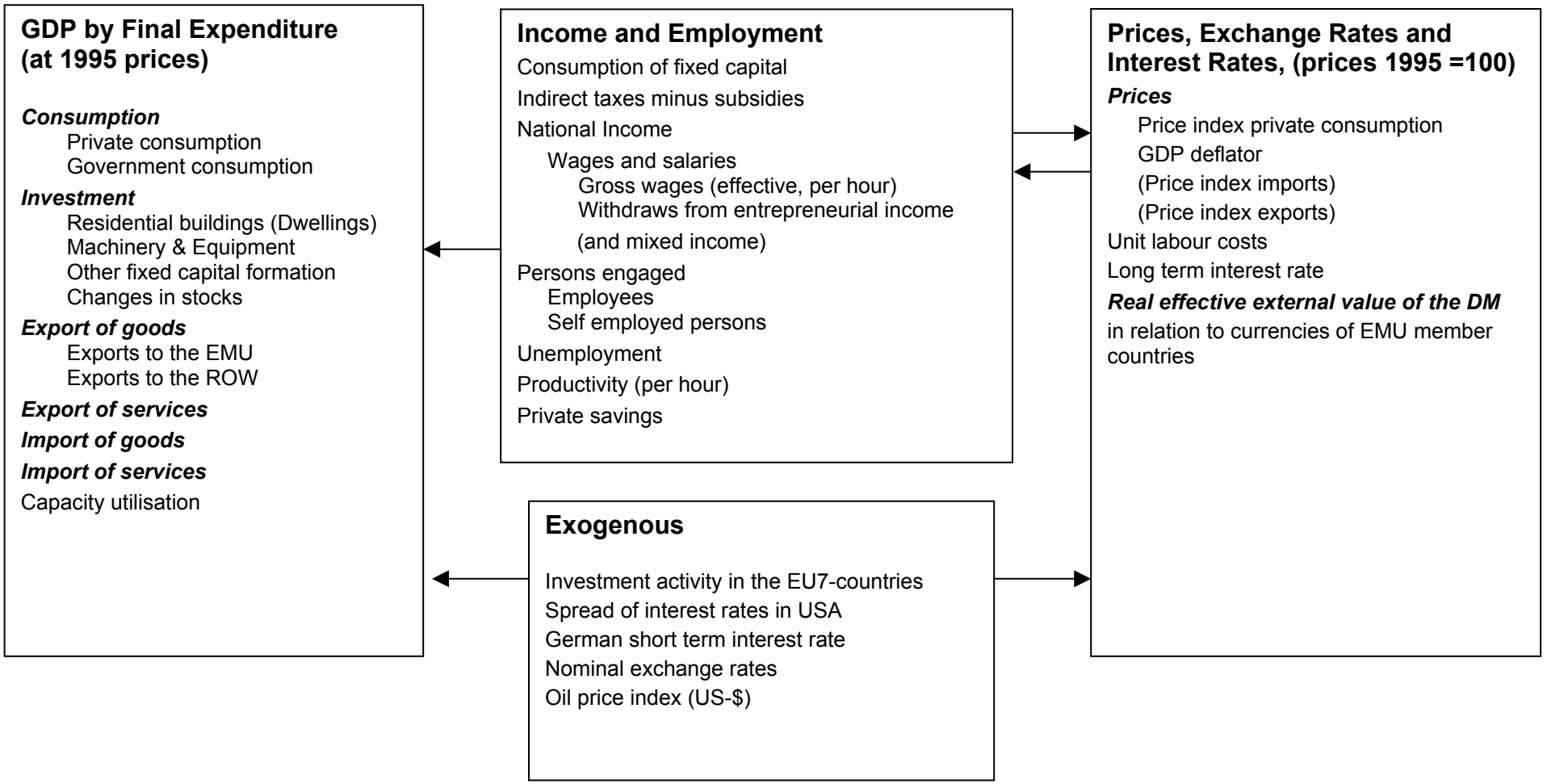
- Existence of nominal rigidities
- Real effects of economic policy
- Market spillovers
- Possibility of unemployment in the long run
- Difference between short- and long-term impacts of explanatory variables

Methodological base

- Analysis of the properties of the time series
- Estimation of error correction models
- Tests of the forecast quality of the stochastic equations
- Tests of auto correlation of the residuals and stability of the coefficients
- Tests of ex post simulation of an equation inside the model

A.1. European Business Cycle Model





A.2. Structural Macroeconometric Model of France

II. Econometric Methods

Most economic time series are non-stationary and it is generally agreed that they follow a stochastic trend. They are characterized by asymptotically infinite variance and autocorrelations which imply a shock has a permanent effect on the series and thus the series tends to "wander" from a deterministic path without a tendency to return.

Cointegration means that two or more series „wander together". While each of the series is influenced by the permanent effects of shocks there exists a long-run equilibrium relationship between them and a mechanism that forces them back to this equilibrium.

Technically two or more series are cointegrated if they are integrated of degree I(d) and there exists a linear combination of them that is I(d-b). In the bivariate case with d=b=1 that means if there are two economic time series Y_t and X_t that are I(1) and there is a relationship $Y_t - a*X_t = Z_t$ that is I(0) they are cointegrated with cointegrating vector [1 -a] and Z_t is called the equilibrium error.

The concept of Cointegration has become central to econometric time series analysis. One reason is that the equilibrium concept implied closely relates to the theoretical equilibrium view of the economy. Since most economic time series are taken to be I(1) theoretically established equilibrium relations between these imply a cointegrating relationship if the theory is indeed empirically valid. Non-cointegration would lead to I(1) error terms Z_t. And this basically means that no equilibrium exists since the errors are permanently deviating from zero.

Econometrically the analysis of the relationship between two or more cointegrated I(1) time series is performed in an error correction framework. This approach is a re-parametrization of an autoregressive distributed-lag equation that explicitly takes into account the long-run equlibrium relation as well as the short-term dynamics of the series.
An error correction model (ECM) for Y_t as endogenous and X_t as exogenous series can be written as follows:

$$\Delta(Y_t) = \delta + \gamma\left[Y_{t-1} - \det - a * X_{t-1}\right] + \sum_{i=1}^{p} \alpha_i * \Delta(Y_{t-i}) + \sum_{j=1}^{q} \beta_j * \Delta(X_{t-j}) + \varepsilon_t$$

error correction term — short-term dynamics

Δ is the difference operator
det is Deterministic (constant, seasonal dummies etc)
δ is a constant
γ is the speed of adjustment parameter
ε_t is a white noise error term.

The change in Y is influenced by last period's deviation from the theoretically founded equilibrium relationship between the two economic time series and lagged difference terms of the endogenous and exogenous variables. The number of lagged difference terms is chosen as

to make the error term white noise. One can see that OLS provides consistent parameter estimates as all elements are I(0) by definition if the two I(1) variables are cointegrated.

To construct the model the following methodology was employed:

1. relationship(s) for the variable in question were taken from economic theory
2. the time series properties of the endogenous and explanatory series were tested; all series had to be I(1) for cointegration relationships with I(0) equilibrium errors to be feasible
3. (several) cointegrating equations for the variables were tested
4. the empirically verified equilibrium relationship was used to construct an ECM
5. a (second) cointegration test was performed in estimating the ECM
6. the stability and forecasting properties of the ECM were tested, if necessary a respecification was performed
7. the performance of each ECM in the complete system was analysed, if necessary a respecification was performed

There are several possibilities to test for (Co-)Integration. To check the time series properties the Augmented Dickey Fuller (ADF) Test was used, the results are shown in the documentation chapter IV B. For step 3. of the analysis either the Granger methodology or the Johansen procedure was employed. This is not shown in the documentation as cointegration can also be verified in the final ECM used in the model (step 5).

This kind of test was proposed by Banerjee et al. (1992) and it makes use of the t-statistic of the speed of adjustment parameter. The argument from above that each element in the ECM has to be I(0) if Y and X are cointegrated can be turned around: if all elements in the ECM are I(0) than Y and X must be cointegrated. Then if X is exogenous γ must be significant for the adjustment to equilibrium to take place. Thus the Null Hypothesis of non-cointegration implies $\gamma = 0$. The critical values are taken from Banerjee et al. (1992) and are shown in the Appendix. The significance of γ is shown in each of the equations.

Furthermore a battery of specification tests were performed (Serial Correlation LM Test, White's Heteroscedasticity Test, ARCH LM Test, Normality Test and Ramsey's Reset Test) as well as a stability analysis (Cusum, Cusum squared) and a detailed forecast evaluation. For the most important equations a single equation simulation was also added to anaylize the effect of shocks to the explanatory variables.

After an equation for each endogenous variable was satisfactorily specified the definition equations were added and all equations were put together to form the model. Again each equations was analysed, now in its performance in the complete model.

Data base

Raw (seasonally unadjusted) quarterly time series data is used whenever available. The estimation period for most equations is from 1980:1 to 2003:4. National accounts data stems from EUROSTAT.

III. Stochastic Equations

A. National Accounts Statistics: GDP by Final Expenditure

A.1. Private Consumption

Private consumption expenditure; at constant prices (1995) (Gutachten Version)

Dependent Variable: DLOG(FR_C95)
Method: Least Squares
Date: 04/13/04 Time: 14:56
Sample(adjusted): 1981:2 2003:4
Included observations: 91 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.132360	0.575426	3.705708	0.0004
Z1	-0.012682	0.007565	-1.676374	0.0975
Z2	-0.009862	0.003929	-2.509934	0.0141
Z3	-0.015340	0.005469	-2.804952	0.0063
LOG(FR_C95(-1))	**-0.282995**	**0.063645**	**-4.446463**	**0.0000**
LOG(FR_GWAGE95(-1))	**0.105034**	**0.042088**	**2.495569**	**0.0146**
FR_W(-1)	**0.001729**	**0.000479**	**3.606974**	**0.0005**
DLOG(FR_C95(-4))	0.675179	0.063867	10.57169	0.0000
DLOG(FR_Y95(-1))	-0.086804	0.046342	-1.873103	0.0647
DLOG(FR_UR(-1))	-0.091964	0.050796	-1.810456	0.0739

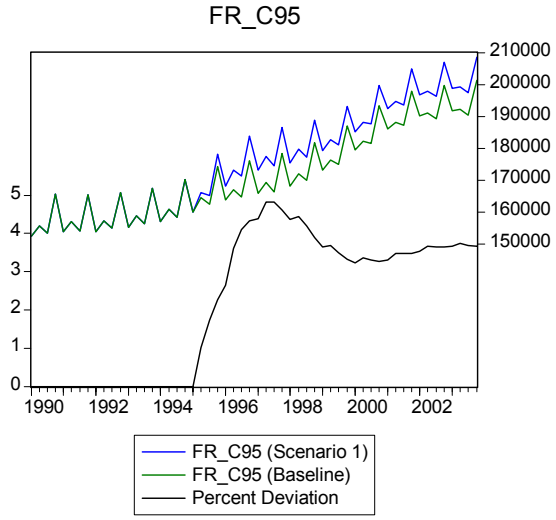
R-squared	0.973376	Mean dependent var	0.005340
Adjusted R-squared	0.970418	S.D. dependent var	0.053177
S.E. of regression	0.009146	Akaike info criterion	-6.447597
Sum squared resid	0.006776	Schwarz criterion	-6.171678
Log likelihood	303.3656	F-statistic	329.0462
Durbin-Watson stat	2.306707	Prob(F-statistic)	0.000000

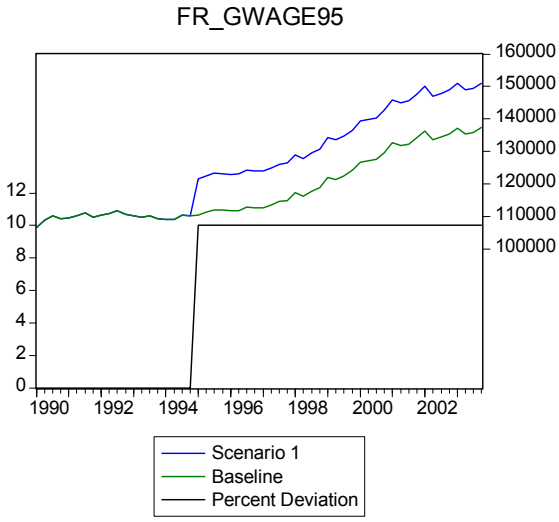
Aggregate private consumption is estimated using the multicointegration approach established by Granger and Lee (1990). For details about the application of the multicointegration approach to private consumption please refer to Hassler(2001).

Residual tests	***Probability***	***Forecast evaluation (dynamic in-sample)***	
Normality test (Jarque-Bera)	0.287293	Root Mean Squared Error	1645.514
Serial Correlation LM test (lag 1)	0.179795	Mean Absolute Percent Error	0.819265
Serial Correlation LM test (lag 4)	0.199539	Theil inequality coefficient	0.005105
White's heteroscedasticity test	0.125256	Bias proportion	0.000050
RESET test (No. of fitted terms:1)	0.318873	Variance proportion	0.003423
ARCH LM test (lag 1)	0.607627	Covariance proportion	0.996527
ARCH LM test (lag 4)	0.912499		
Stability tests			
CUSUM test			
CUSUM sq. test			

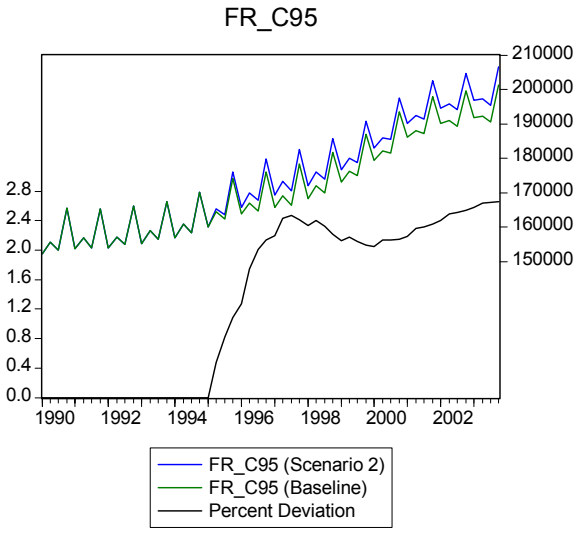
Simulation Properties of the Equation

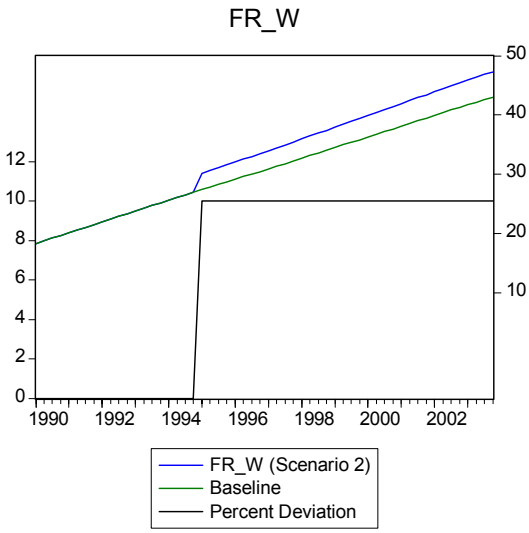
10% Increase in the conpensation of employees



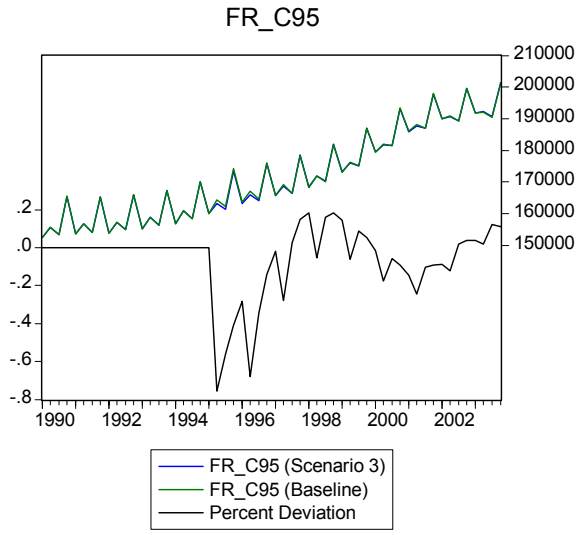


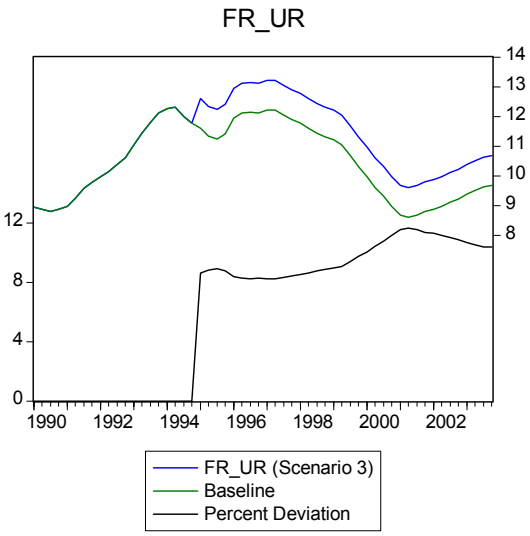
10% Increase in private wealth





1 % Point increase in the unemployment rate





Private consumption expenditure; at constant prices (1995) (Alternative Version)

Dependent Variable: DLOG(FR_C95)
Method: Least Squares
Date: 08/12/04 Time: 16:02
Sample(adjusted): 1982:2 2003:4
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.298974	0.411134	3.159489	0.0023
@TREND(1970:1)	**0.000522**	**0.000153**	**3.416214**	**0.0011**
Z1	-0.039983	0.004572	-8.745897	0.0000
Z2	-0.050512	0.004921	-10.26474	0.0000
Z3	-0.023722	0.005238	-4.528973	0.0000
I8704	0.024474	0.005794	4.223921	0.0001
I8802+I9301	-0.020117	0.004269	-4.712969	0.0000
LOG(FR_C95(-1))	**-0.494553**	**0.077767**	**-6.359406**	**0.0000**
LOG(100*FR_GYEE(-1)/FR_PC(-1))	**0.265438**	**0.047510**	**5.586929**	**0.0000**
LOG(100*FR_GYPROP(-1)/FR_PC(-1))	**0.122999**	**0.020980**	**5.862735**	**0.0000**
DLOG(FR_C95(-1))	-0.272477	0.075393	-3.614111	0.0006
DLOG(FR_C95(-2)) +DLOG(FR_C95(-4))	0.183870	0.038170	4.817162	0.0000
DLOG(100*FR_GYPROP(-0) /FR_PC(-0))	0.073012	0.013820	5.282906	0.0000
DLOG(100*FR_GYPROP(-7) /FR_PC(-7)) +DLOG(100*FR_GYPROP(-8) /FR_PC(-8))	0.075120	0.016281	4.614033	0.0000
D(FR_UR(-1))	0.006369	0.003694	1.724131	0.0891
D(FR_UR(-3))	-0.018692	0.004394	-4.253965	0.0001
D(FR_UR(-5))	0.014279	0.003982	3.586228	0.0006

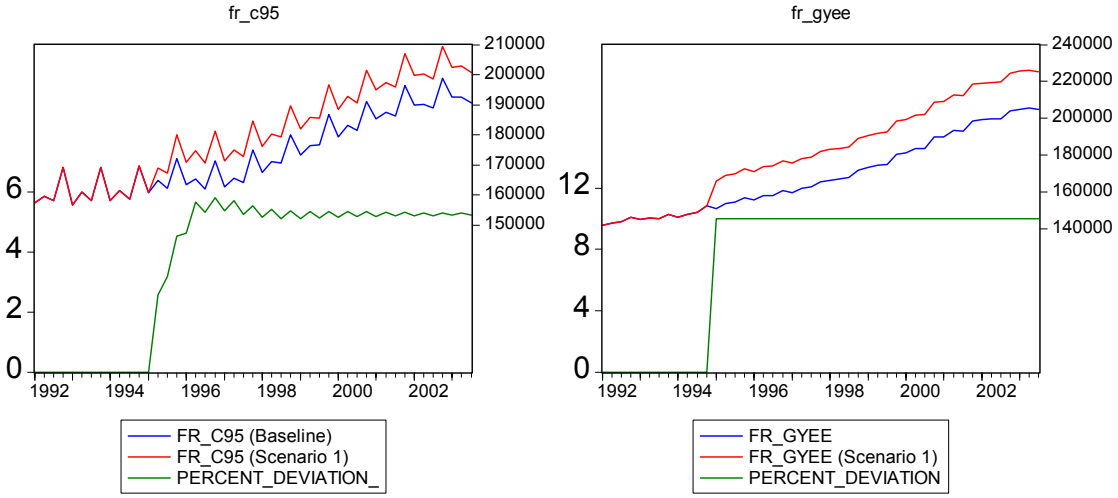
R-squared	0.990734	Mean dependent var	0.005230
Adjusted R-squared	0.988616	S.D. dependent var	0.051412
S.E. of regression	0.005486	Akaike info criterion	-7.399991
Sum squared resid	0.002106	Schwarz criterion	-6.918147
Log likelihood	338.8996	F-statistic	467.7593
Durbin-Watson stat	1.939842	Prob(F-statistic)	0.000000

Aggregate private consumption is estimated as being a function of the real compensation of employees and the real gross operating surplus and mixed income. The long-run elasticities of aggregate consumption with respect to these two variables are 0.5367 and 0.2487, respectively. The short run consumption dynamics also are determined, besides from the mentioned variables, by the unemployment rate.

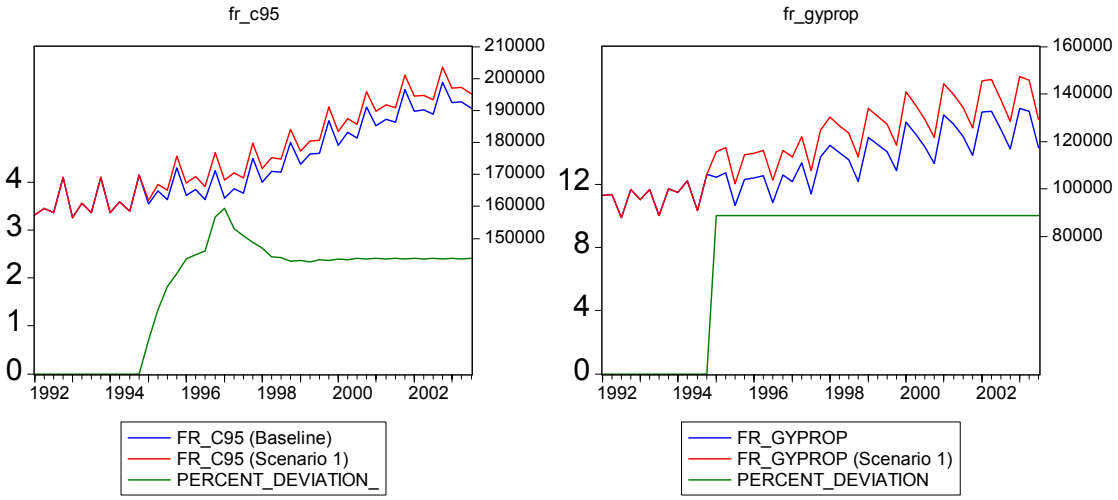
Residual tests	***Probability***	***Forecast evaluation (dynamic in-sample)***	
Normality test (Jarque-Bera)	0.669637	Root Mean Squared Error	900.4261
Serial Correlation LM test (lag 1)	0.978923	Mean Absolute Percent Error	0.429576
Serial Correlation LM test (lag 4)	0.282529	Theil inequality coefficient	0.002773
White's heteroscedasticity test	0.436726	Bias proportion	0.001043
RESET test (No. of fitted terms:1)	0.574403	Variance proportion	0.000503
ARCH LM test (lag 1)	0.162921	Covariance proportion	0.998454
ARCH LM test (lag 4)	0.391034		
Stability tests			
CUSUM test	0		
CUSUM sq. test	0		

Simulation properties of the equation

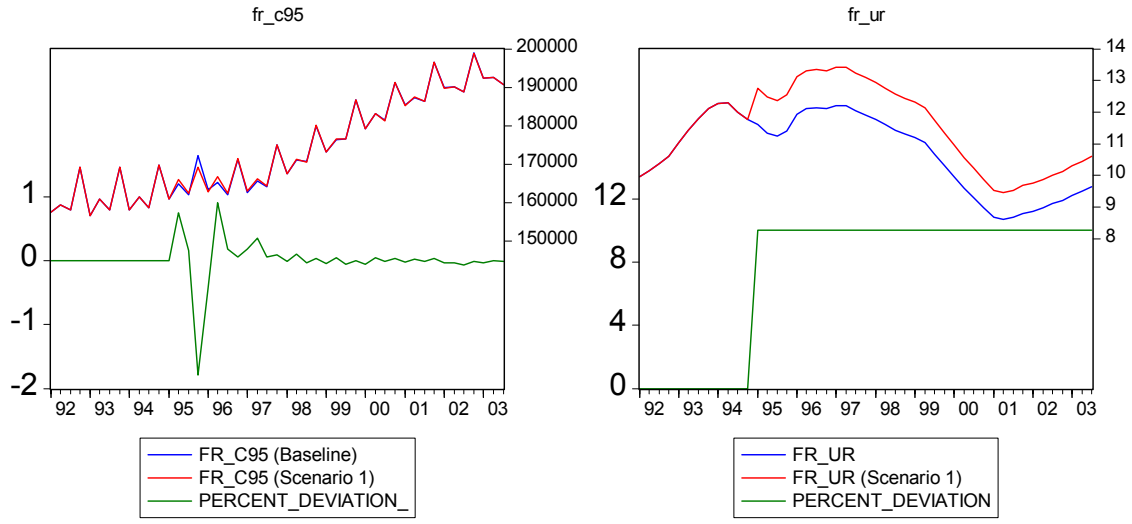
10% Increase in the compensation of employees



10% Increase in the gross profits and mixed income



1% point increase in the unemployment rate



A.2. Government Consumption

Government Consumption; at constant prices (1995)

Dependent Variable: DLOG(FR_CGOV95)
Method: Least Squares
Date: 04/13/04 Time: 14:59
Sample(adjusted): 1981:2 2003:4
Included observations: 91 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.291583	0.103563	-2.815518	0.0061
Z1	-0.033106	0.014448	-2.291352	0.0245
Z2	-0.044060	0.006231	-7.070711	0.0000
Z3	-0.074316	0.013416	-5.539493	0.0000
LOG(FR_CGOV95(-1))	**-0.130961**	**0.033794**	**-3.875275**	**0.0002**
LOG(FR_GDP95(-1))	**0.139460**	**0.035867**	**3.888207**	**0.0002**
DLOG(FR_CGOV95(-2) +FR_CGOV95(-4))	0.635738	0.101288	6.276556	0.0000
DLOG(FR_GDP95(-1))	-0.173417	0.121057	-1.432531	0.1558
DLOG(FR_GDP95(-4))	-0.486914	0.122057	-3.989242	0.0001

R-squared	0.813743	Mean dependent var	0.006248
Adjusted R-squared	0.795572	S.D. dependent var	0.017898
S.E. of regression	0.008093	Akaike info criterion	-6.702088
Sum squared resid	0.005370	Schwarz criterion	-6.453761
Log likelihood	313.9450	F-statistic	44.78163
Durbin-Watson stat	2.069531	Prob(F-statistic)	0.000000

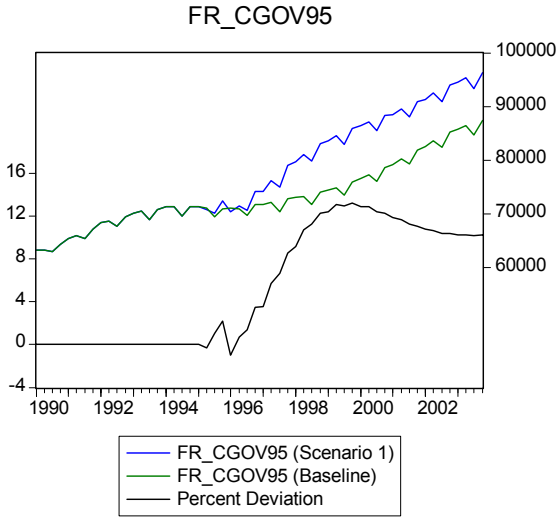
In the equation above government consumption at constant prices is explained by a simple reaction function. Thereafter government consumption is increased at a very similar growth rate as the real GDP growth rate.

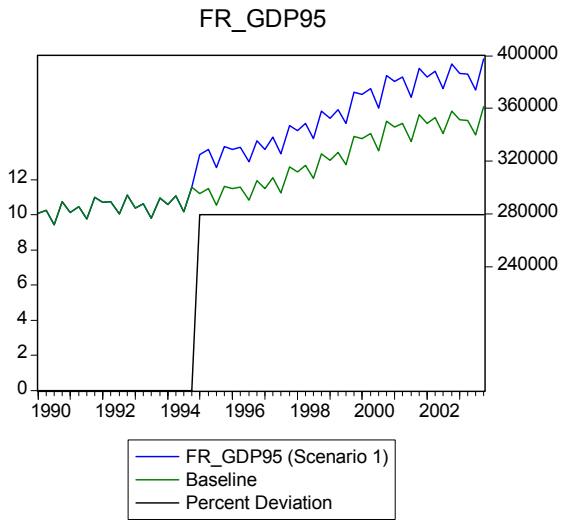
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.256408	Root mean squared error	1103.622
Serial Correlation LM test (lag 1)	0.317603	Mean absolute percent error	1.297199
Serial Correlation LM test (lag 4)	0.021475	Theil inequality coefficient	0.008176
White's heteroscedasticity test	0.00428	Bias proportion	0.005877
ARCH LM test (lag 1)	0.07757	Variance proportion	0.025147
ARCH LM test (lag 4)	0.060748	Covariance proportion	0.968976

Stability tests	
Reset test (lag 1)	0.012314
CUSUM test[a]	0
$CUSUM^2$ test[a]	1992:1-2002:1

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

10% Increase in the Gross Domestic Product





A.3. Investment

Dependent Variable: DLOG(FR_IMEQ95)
Method: Least Squares
Date: 05/26/04 Time: 15:51
Sample(adjusted): 1982:2 2003:4
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.069500	0.570498	-1.874678	0.0647
Z1	-0.084457	0.017969	-4.700205	0.0000
Z2	-0.041440	0.013012	-3.184761	0.0021
Z3	-0.111999	0.024055	-4.655921	0.0000
S80_89*@TREND(1970:1)	**0.000130**	**0.000110**	**1.177689**	**0.2426**
LOG(FR_IMEQ95(-1))	**-0.121599**	**0.048064**	**-2.529944**	**0.0135**
LOG(FR_END95(-1))	**0.181760**	**0.080628**	**2.254312**	**0.0271**
DLOG(FR_IMEQ95(-4))	0.438937	0.105371	4.165615	0.0001
DLOG(FR_END95(-3))	0.559525	0.253649	2.205907	0.0304
DLOG(FR_ULC(-2))	-0.467034	0.197087	-2.369685	0.0203
DLOG(FR_RRL5Y(-2) +FR_RRL5Y(-4))	-0.042624	0.023126	-1.843099	0.0692

R-squared	0.927978	Mean dependent var	0.009985
Adjusted R-squared	0.918501	S.D. dependent var	0.065123
S.E. of regression	0.018591	Akaike info criterion	-5.014555
Sum squared resid	0.026268	Schwarz criterion	-4.702774
Log likelihood	229.1332	F-statistic	97.92324
Durbin-Watson stat	2.063868	Prob(F-statistic)	0.000000

French investment in machinery and equipment are explained in the long-run by the domestic GDP (in constant 1995 prices). The corresponding elasticity with respect to this variable is 1.296. For the short-run dynamics of this kind of investment unit labor costs, real long-term interest rate and the domestic GDP also play an important role.

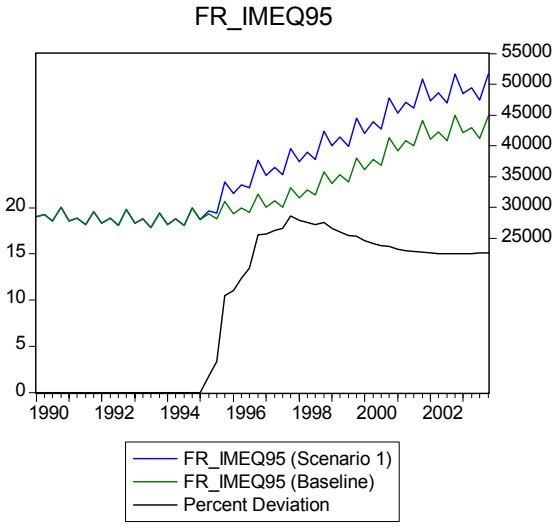
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.383935	Root mean squared error	1246.115
Serial Correlation LM test (lag 1)	0.674277	Mean absolute percent error	3.139522
Serial Correlation LM test (lag 4)	0.433589	Theil inequality coefficient	0.020765
White's heteroscedasticity test	0.907689	Bias proportion	0.008021
ARCH LM test (lag 1)	0.892995	Variance proportion	0.036119
ARCH LM test (lag 4)	0.963772	Covariance proportion	0.955861

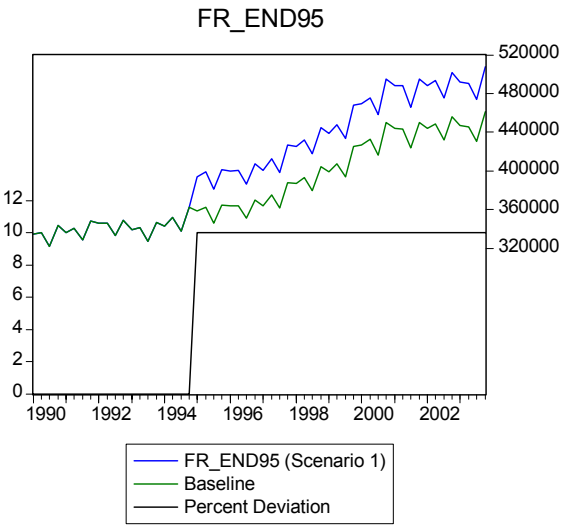
Stability tests	
Reset test (lag 1)	0.021369
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

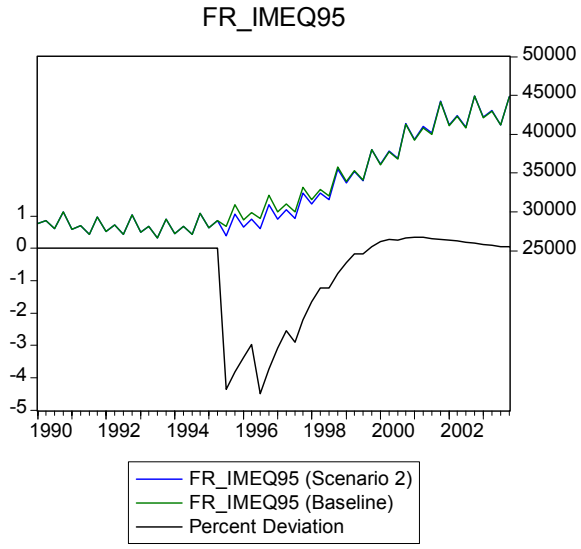
Simulation properties of the equation:

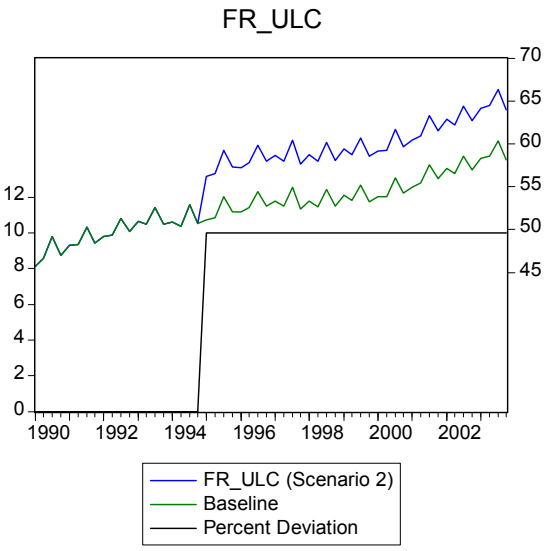
10% Increase in the final demand (in constant 1995)



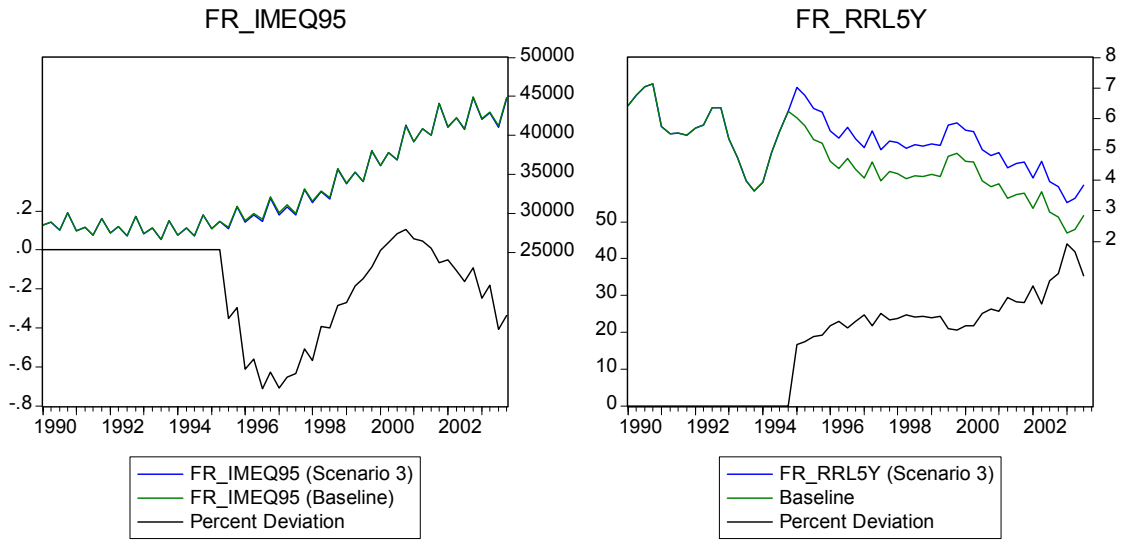


1% Point increase in the nominal unit labor costs





10% increase in the real long term interest rate



Investment: Non-residential buildings (at constant prices of 1995)

Dependent Variable: DLOG(FR_ICON95)
Method: Least Squares
Date: 07/21/04 Time: 11:36
Sample(adjusted): 1982:2 2003:4
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.490735	0.340192	4.382034	0.0000
Z1	-0.068846	0.027881	-2.469273	0.0158
Z2	0.018075	0.010863	1.663956	0.1003
Z3	-0.076684	0.025083	-3.057150	0.0031
S88_92	0.017159	0.006292	2.726927	0.0080
LOG(FR_ICON95(-1))	**-0.223974**	**0.048444**	**-4.623330**	**0.0000**
LOG(FR_IEND95(-1))	**0.062969**	**0.021769**	**2.892630**	**0.0050**
DLOG(FR_ICON95(-6))	0.122347	0.092594	1.321319	0.1904
DLOG(FR_ICON95(-4))	0.509125	0.094759	5.372825	0.0000
DLOG(FR_IEND95(-1))	0.220340	0.250260	0.880443	0.3814
DLOG(FR_IEND95(-3))	0.645202	0.249560	2.585354	0.0117
DLOG(FR_RRL5Y(-2) +FR_RRL5Y(-4))	-0.031378	0.019817	-1.583377	0.1175

R-squared	0.911141	Mean dependent var	0.001487
Adjusted R-squared	0.898109	S.D. dependent var	0.050131
S.E. of regression	0.016002	Akaike info criterion	-5.304775
Sum squared resid	0.019205	Schwarz criterion	-4.964650
Log likelihood	242.7577	F-statistic	69.91233
Durbin-Watson stat	2.307647	Prob(F-statistic)	0.000000

French investment in non-residential buildings depend in the long-run on domestic demand and on the interest costs. In the short-run adjustment these variables also play an important role.

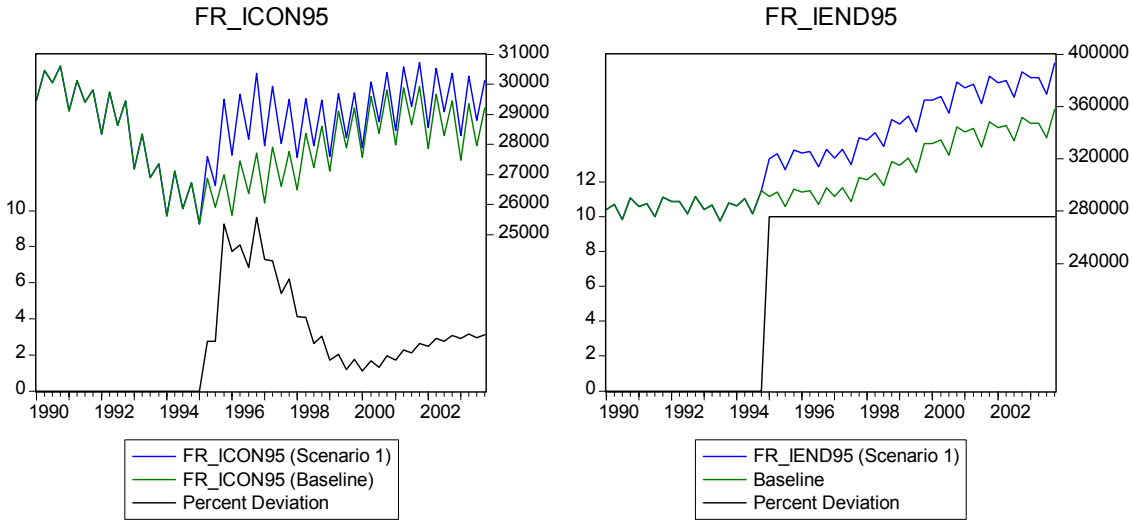
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.00195	Root mean squared error	779.3916
Serial Correlation LM test (lag 1)	0.066339	Mean absolute percent error	2.135706
Serial Correlation LM test (lag 4)	0.054012	Theil inequality coefficient	0.014126
White's heteroscedasticity test	0.224041	Bias proportion	0.000174
ARCH LM test (lag 1)	0.77099	Variance proportion	0.043594
ARCH LM test (lag 4)	0.062804	Covariance proportion	0.956233

Stability tests	
Reset test (lag 1)	0.006314
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

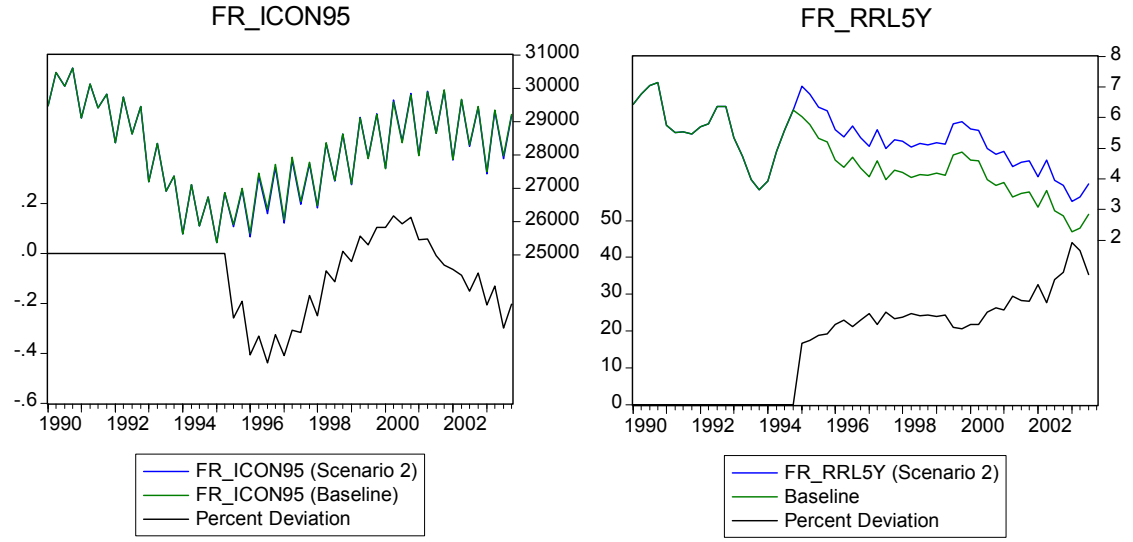
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation properties of the equation:

10% Increase in the domestic final demand (in constant 1995 prices)



1% Point increase in the real long-term interest rate



Change in stocks; at constant prices (1995)

Dependent Variable: FR_IS95
Method: Least Squares
Date: 05/26/04 Time: 15:51
Sample(adjusted): 1981:2 2001:2
Included observations: 81 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1048.498	197.0308	-5.321496	0.0000
Z1	-293.2693	2094.519	-0.140017	0.8890
Z2	6825.127	1724.927	3.956762	0.0002
Z3	-3831.029	2306.530	-1.660949	0.1011
FR_IS95(-3)	0.356866	0.102077	3.496039	0.0008
FR_IS95(-4)	0.433162	0.087369	4.957853	0.0000
FR_IS95(-5)	-0.434418	0.100800	-4.309698	0.0001
D(FR_GDP95(-1))	0.225569	0.062530	3.607385	0.0006
D(FR_GDP95(-2))	0.271212	0.061041	4.443118	0.0000
D(FR_GDP95(-3))	0.367949	0.066237	5.555033	0.0000

R-squared	0.936150	Mean dependent var	307.2765
Adjusted R-squared	0.928057	S.D. dependent var	3961.221
S.E. of regression	1062.487	Akaike info criterion	16.88976
Sum squared resid	80150414	Schwarz criterion	17.18537
Log likelihood	-674.0352	F-statistic	115.6655
Durbin-Watson stat	1.802038	Prob(F-statistic)	0.000000

Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.218424	Root mean squared error	1145.114
Serial Correlation LM test (lag 1)	0.291529	Mean absolute percent error	191.8118
Serial Correlation LM test (lag 4)	0.578654	Theil inequality coefficient	0.14979
White's heteroscedasticity test	0.098592	Bias proportion	0.000016
ARCH LM test (lag 1)	0.887401	Variance proportion	0.032349
ARCH LM test (lag 4)	0.93959	Covariance proportion	0.967634

Stability tests	
Reset test (lag 1)	0.899082
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

A.4. Export of Goods and Services

French export of goods to the EMU at 1995 prices

Dependent Variable: DLOG(FR_XG95_EWU)
Method: Least Squares
Date: 05/26/04 Time: 15:56
Sample(adjusted): 1982:1 2003:3
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FR_XG95_EWU(-1))	**-0.393328**	**0.075493**	**-5.210130**	**0.0000**
LOG(EU8OFR_IFC95(-1))	**0.123071**	**0.065979**	**1.865313**	**0.0663**
LOG(EU8OFR_X95(-1))	**0.389044**	**0.077535**	**5.017665**	**0.0000**
LOG(FR_REEV_EWU(-1))	**-0.641893**	**0.277108**	**-2.316396**	**0.0235**
Z1	0.015314	0.051363	0.298155	0.7665
Z2	-0.082081	0.033253	-2.468382	0.0160
Z3	-0.177813	0.044075	-4.034317	0.0001
C	0.555225	1.360332	0.408154	0.6844
DLOG(FR_XG95_EWU(-1))	-0.085306	0.103984	-0.820374	0.4148
D(S9301)	-0.080691	0.033150	-2.434087	0.0175
DLOG(EU8OFR_IFC95(-0))	0.565873	0.156959	3.605231	0.0006
DLOG(EU8OFR_IFC95(-1))	0.618245	0.157187	3.933177	0.0002
DLOG(EU8OFR_IFC95(-2))	0.561531	0.155103	3.620388	0.0006
DLOG(EU8OFR_IFC95(-3))	0.538590	0.155103	3.472462	0.0009
DLOG(EU8OFR_IFC95(-4))	0.332086	0.159124	2.086966	0.0405
DLOG(FR_REEV_EWU(-1))	0.633312	0.355715	1.780394	0.0794
DLOG(FR_REEV_EWU(-2))	0.630651	0.324301	1.944644	0.0558

R-squared	0.937309	Mean dependent var	0.015895
Adjusted R-squared	0.922980	S.D. dependent var	0.099909
S.E. of regression	0.027727	Akaike info criterion	-4.159415
Sum squared resid	0.053816	Schwarz criterion	-3.677571
Log likelihood	197.9346	F-statistic	65.41210
Durbin-Watson stat	1.998366	Prob(F-statistic)	0.000000

French exports of goods to the EMU are explained by a demand variable that reflects the economic activity in the euro area (real investment in the EU7 countries - EU8OFR, i.e. EU8 without France: Germany, the Netherlands, Italy, Spain, Belgium, Finland and Austria), by the total export volume of the same countries (as a measure of the overall competitiveness of the European countries) and by a variable that reflects the price competitiveness of Dutch exporters, namely the real external value of the French franc with respect to other European currencies. Originally, this variable has been the real external value of the Dutch florins in relation to a basket of the European currencies. It was compiled by weighting the bilateral real external values (based on relative consumer prices) with the respective country's share in French exports. After the introduction of the euro there are no longer exchange rate fluctuations and this variable therefore reflects from 1999 onwards differences in the price development in Germany and in the other EMU member countries.

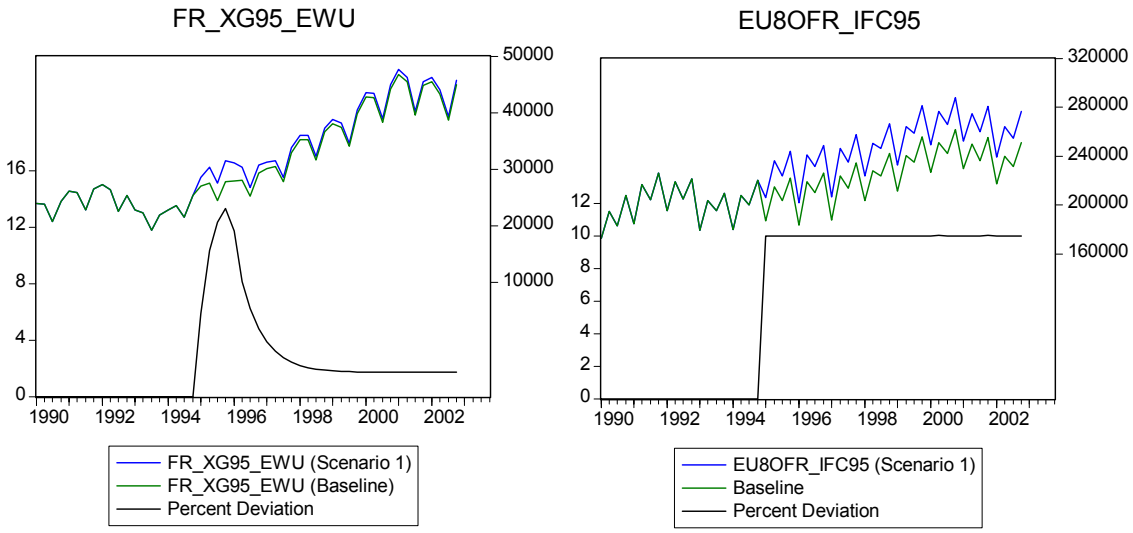
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.483091	Root mean squared error	789.0129
Serial Correlation LM test (lag 1)	0.609402	Mean absolute percent error	2.22169
Serial Correlation LM test (lag 4)	0.465664	Theil inequality coefficient	0.014806
White's heteroscedasticity test	0.587458	Bias proportion	0.000155
ARCH LM test (lag 1)	0.976688	Variance proportion	0.000163
ARCH LM test (lag 4)	0.986893	Covariance proportion	0.999683

Stability tests	
Reset test (lag 1)	0.230671
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

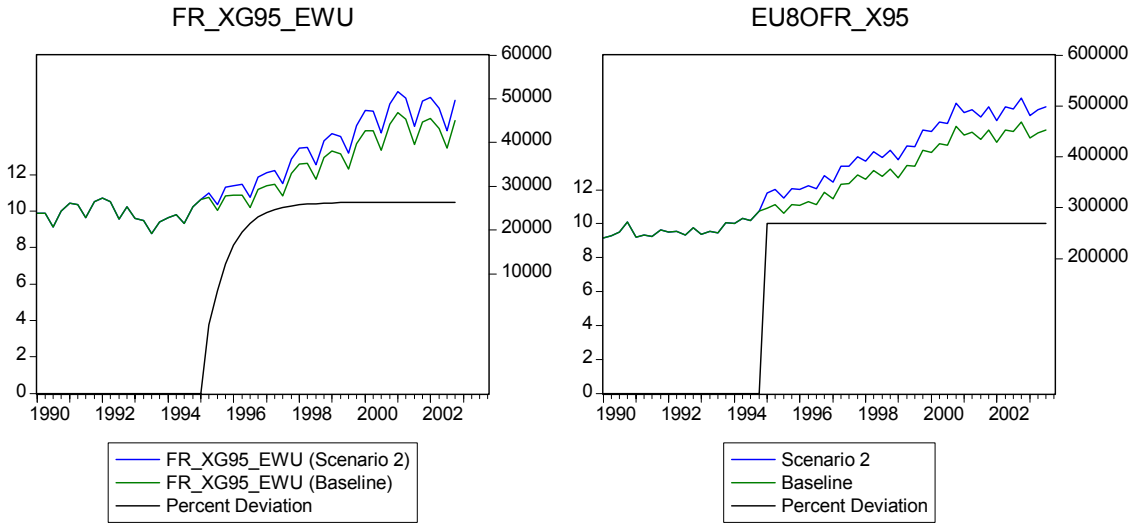
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation property of the equation:

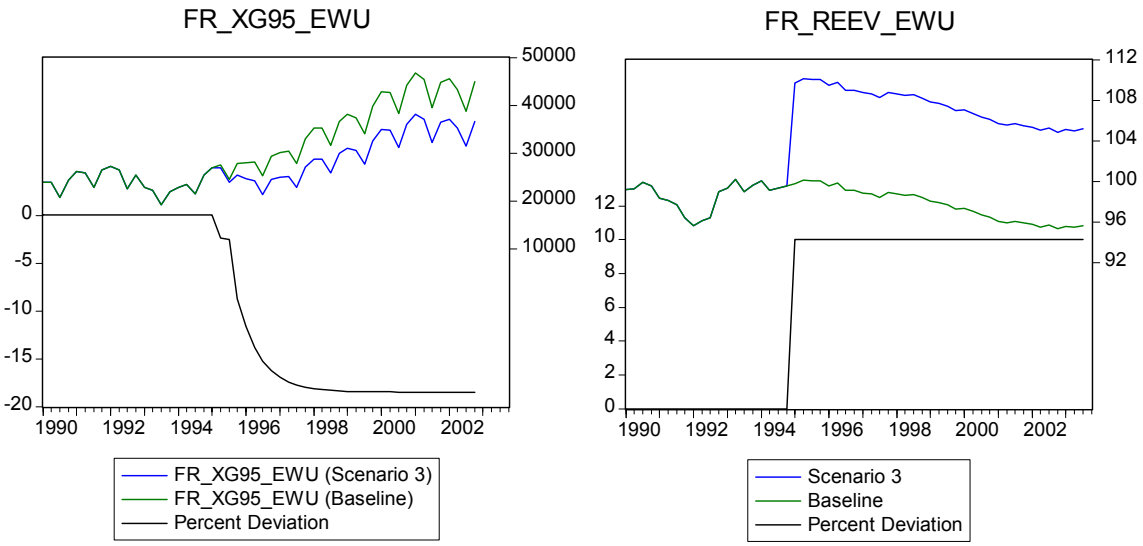
10% increase in EMU investment activity



10% increase in the european exports of goods and services



10% loss in price competitiveness



French export of goods to the rest of the world at 1995 prices

Dependent Variable: DLOG(FR_XG95_ROW)
Method: Least Squares
Date: 05/26/04 Time: 15:56
Sample(adjusted): 1982:1 2003:3
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.824344	1.006325	2.806592	0.0064
Z1	-0.057255	0.024459	-2.340863	0.0220
Z2	-0.022353	0.013598	-1.643803	0.1045
Z3	-0.027783	0.029915	-0.928724	0.3561
@TREND(1970:1)*S9301	**0.000981**	**0.000320**	**3.063445**	**0.0031**
LOG(FR_XG95_ROW(-1))	**-0.290627**	**0.070497**	**-4.122531**	**0.0001**
LOG(ROW_GDP95(-1))	**0.258120**	**0.062880**	**4.104975**	**0.0001**
LOG(FR_REEV_CPI(-1))	**-0.244703**	**0.129808**	**-1.885113**	**0.0634**
DLOG(FR_XG95_ROW(-4))	0.216971	0.095036	2.283040	0.0253
DLOG(FR_REEV_CPI(-1))	-0.745433	0.270996	-2.750713	0.0075
DLOG(FR_REEV_CPI(-3))	-0.385255	0.287099	-1.341886	0.1838
DLOG(ROW_GDP95(-2))	-2.969233	1.061888	-2.796182	0.0066
DLOG(ROW_GDP95(-3))	1.173174	1.116899	1.050385	0.2970
D(S9301)	0.104336	0.041603	2.507919	0.0144

R-squared	0.832588	Mean dependent var	0.008152
Adjusted R-squared	0.802775	S.D. dependent var	0.082680
S.E. of regression	0.036718	Akaike info criterion	-3.624707
Sum squared resid	0.098420	Schwarz criterion	-3.227894
Log likelihood	171.6748	F-statistic	27.92689
Durbin-Watson stat	2.089529	Prob(F-statistic)	0.000000

French exports of goods to the rest of the world are explained by a demand variable (real GDP of the rest of the world) that reflects the economic world activity, by a linear trend approximating the growing international division of labor and the liberalization of the goods markets and by a variable that reflects the price competitiveness of French exporters (the real external value of the French products relative to the foreign ones).

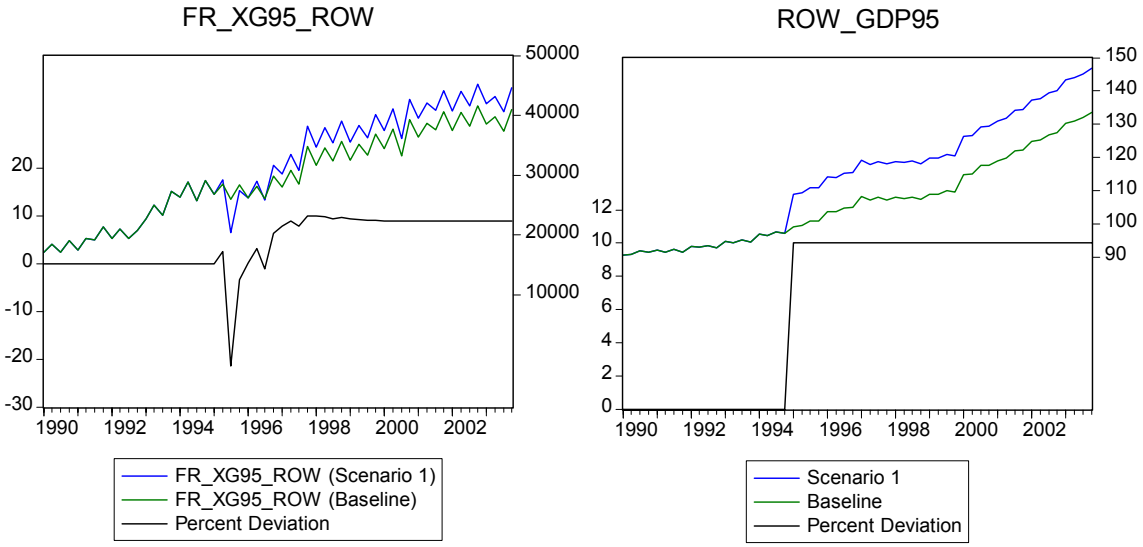
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.091375	Root mean squared error	998.1434
Serial Correlation LM test (lag 1)	0.118219	Mean absolute percent error	3.40097
Serial Correlation LM test (lag 4)	0.066639	Theil inequality coefficient	0.019166
White's heteroscedasticity test	0.759146	Bias proportion	0.003252
ARCH LM test (lag 1)	0.111896	Variance proportion	0.076941
ARCH LM test (lag 4)	0.098651	Covariance proportion	0.919806

Stability tests	
Reset test (lag 1)	0.152146
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

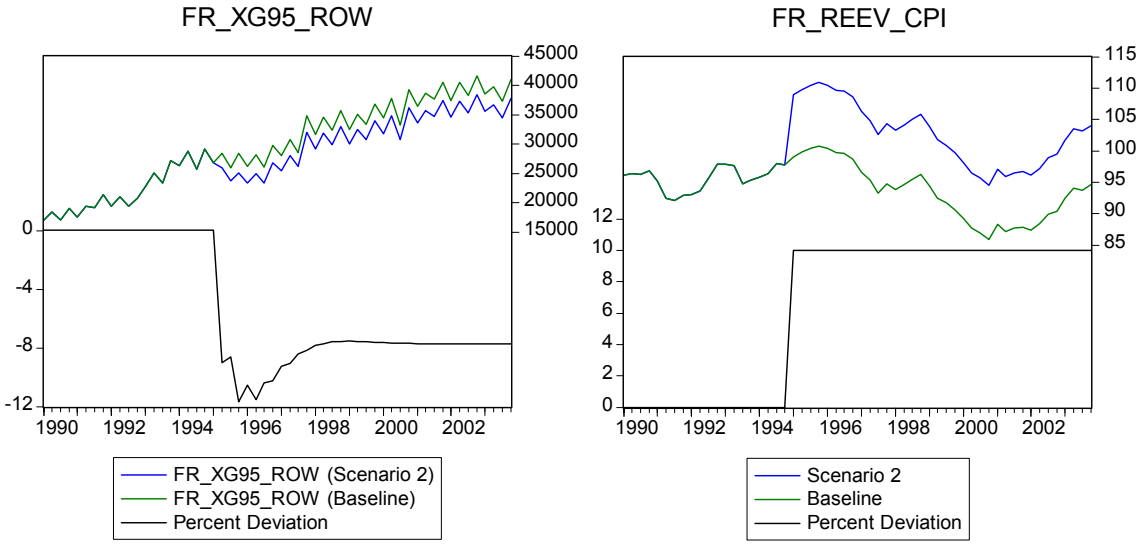
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation property of the equation:

10% increase in ROW_GDP95



10% loss in price competitiveness



French exports of services (at 1995 prices)

Dependent Variable: DLOG(FR_XS95)
Method: Least Squares
Date: 05/26/04 Time: 15:56
Sample: 1982:1 2003:4
Included observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.024843	0.351495	-0.070677	0.9438
Z1	-0.006281	0.004459	-1.408476	0.1630
Z2	-0.024955	0.004865	-5.129764	0.0000
Z3	-0.009494	0.004262	-2.227496	0.0288
LOG(FR_XS95(-1))	**-0.156607**	**0.041097**	**-3.810675**	**0.0003**
LOG(FR_XG95(-1))	**0.068452**	**0.027653**	**2.475379**	**0.0155**
LOG(FR_REEV_CPI(-1))	**-0.073604**	**0.050379**	**-1.461007**	**0.1480**
LOG(EU8OFR_GDP95(-1))	**0.079814**	**0.050201**	**1.589894**	**0.1159**
DLOG(FR_XS95(-1))	0.601406	0.076449	7.866793	0.0000
DLOG(FR_REEV_CPI(-1))	-0.229474	0.087738	-2.615452	0.0107

R-squared	0.691334	Mean dependent var	0.008248
Adjusted R-squared	0.655719	S.D. dependent var	0.019449
S.E. of regression	0.011412	Akaike info criterion	-6.001717
Sum squared resid	0.010158	Schwarz criterion	-5.720201
Log likelihood	274.0755	F-statistic	19.41118
Durbin-Watson stat	2.075413	Prob(F-statistic)	0.000000

The export of services is closely related to the export of goods via transportation and related services (assurances etc.). It also is determined by the price competitiveness of French services and by the overall economic performance of the neighbouring countries. Therefore, a cointegration relationship between the export of services, the export of goods and the real external value of the (French Franc) Euro in relation to the currencies of a broad group of countries is reasonable. The coefficients have the expected signs: there is a positive relationship between the export of services and the export of goods. This is in line with the expectation that more transportation is required if the export of goods increases. There is a negative relationship between the export of services and the real external value of the (French Franc)Euro and a positive relationship between services exports and the economic activity of the other European countries.

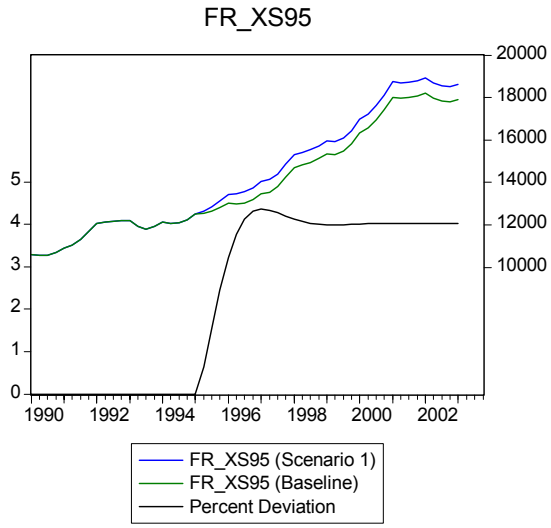
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.66554	Root mean squared error	355.6032
Serial Correlation LM test (lag 1)	0.715824	Mean absolute percent error	2.136607
Serial Correlation LM test (lag 4)	0.517077	Theil inequality coefficient	0.014471
White's heteroscedasticity test	0.314089	Bias proportion	0.00601
ARCH LM test (lag 1)	0.566507	Variance proportion	0.03668
ARCH LM test (lag 4)	0.588237	Covariance proportion	0.957311

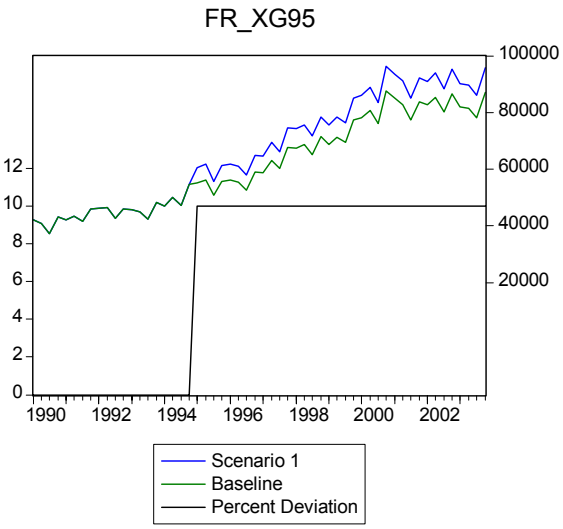
Stability tests	
Reset test (lag 1)	0.685699
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

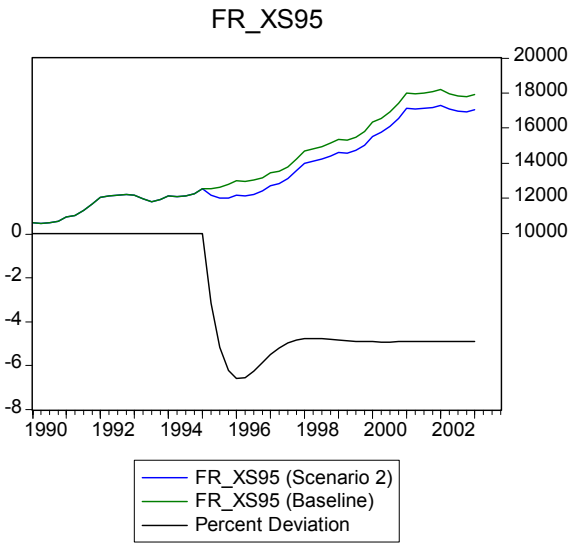
Simulation property of the equation:

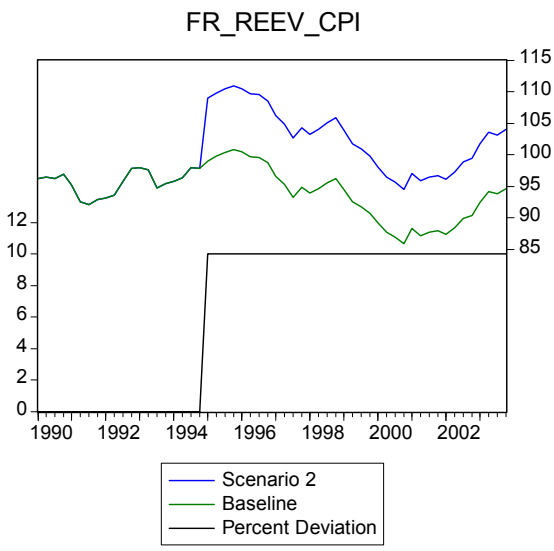
10% increase in export of goods





10% loss in the price competitiveness





A.5. Import of Goods and Services

French import of goods and services at 1995 prices

Dependent Variable: DLOG(FR_M95)
Method: Least Squares
Date: 05/26/04 Time: 15:51
Sample(adjusted): 1981:2 2003:4
Included observations: 91 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.439076	0.400697	-1.095780	0.2765
Z1	-0.105424	0.014959	-7.047605	0.0000
Z2	-0.094326	0.007702	-12.24631	0.0000
Z3	-0.177363	0.018211	-9.739528	0.0000
LOG(FR_M95(-1))	**-0.378892**	**0.107895**	**-3.511687**	**0.0007**
LOG(FR_X95(-1))	**0.262067**	**0.071838**	**3.648020**	**0.0005**
LOG(FR_IFC95(-1))	**0.157754**	**0.071241**	**2.214359**	**0.0297**
LOG(FR_PM(-1) /FR_PGESDEF(-1))	**-0.072918**	**0.038060**	**-1.915894**	**0.0590**
DLOG(FR_IFC95(-2))	0.239874	0.118357	2.026691	0.0461
DLOG(FR_IFC95(-3))	0.384315	0.116776	3.291054	0.0015
DLOG(FR_PM(-3) /FR_PGESDEF(-3))	0.291947	0.122281	2.387505	0.0194
DLOG(FR_PM(-4) /FR_PGESDEF(-4))	-0.570176	0.128474	-4.438055	0.0000
I92019301	-0.021214	0.009783	-2.168466	0.0332

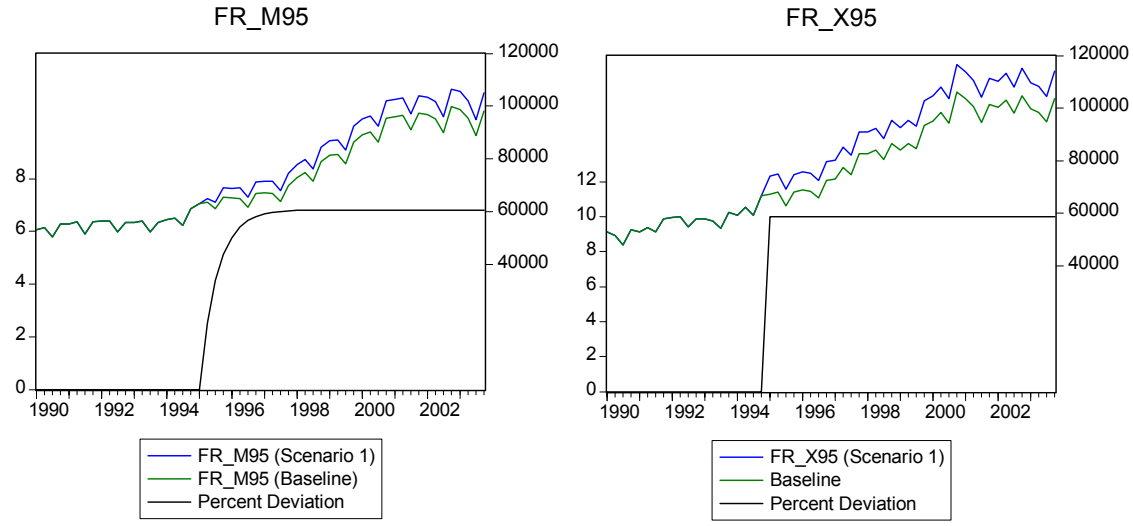
R-squared	0.921556	Mean dependent var	0.011895
Adjusted R-squared	0.909487	S.D. dependent var	0.063375
S.E. of regression	0.019067	Akaike info criterion	-4.950185
Sum squared resid	0.028356	Schwarz criterion	-4.591491
Log likelihood	238.2334	F-statistic	76.36122
Durbin-Watson stat	2.034465	Prob(F-statistic)	0.000000

France's import of goods and services is explained principally by the French total export volume, the domestic investment in fixed capital (as a measure of the domestic economic activity) and the relative import price.

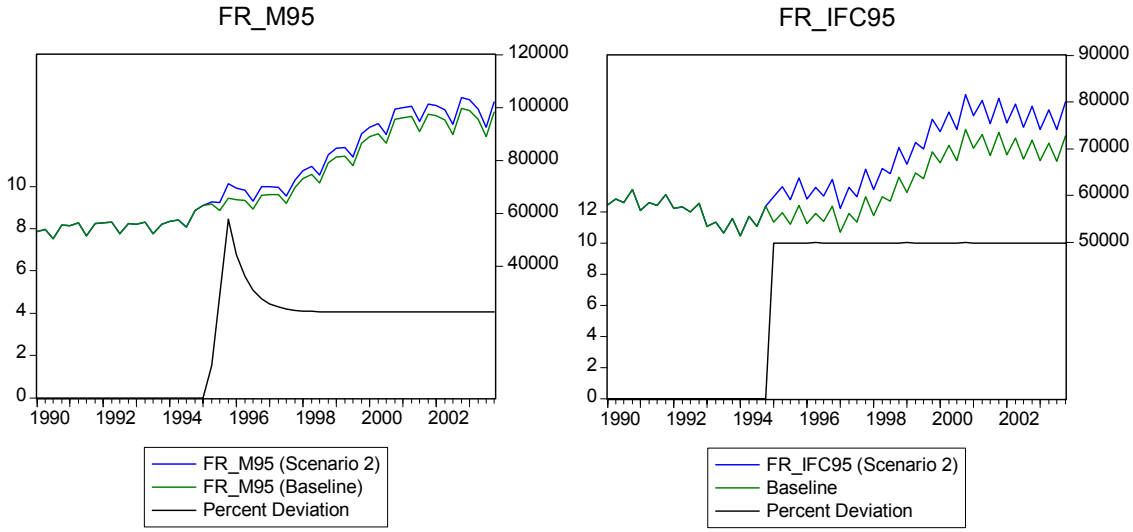
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.673323	Root mean squared error	1360.858
Serial Correlation LM test (lag 1)	0.862627	Mean absolute percent error	1.724616
Serial Correlation LM test (lag 4)	0.579243	Theil inequality coefficient	0.01084
White's heteroscedasticity test	0.663598	Bias proportion	0
ARCH LM test (lag 1)	0.88595	Variance proportion	0.001307
ARCH LM test (lag 4)	0.155463	Covariance proportion	0.998693
Stability tests			
Reset test (lag 1)	0.489963		
CUSUM test[a]	0		
$CUSUM^2$ test[a]	0		

Simulation property of the equation

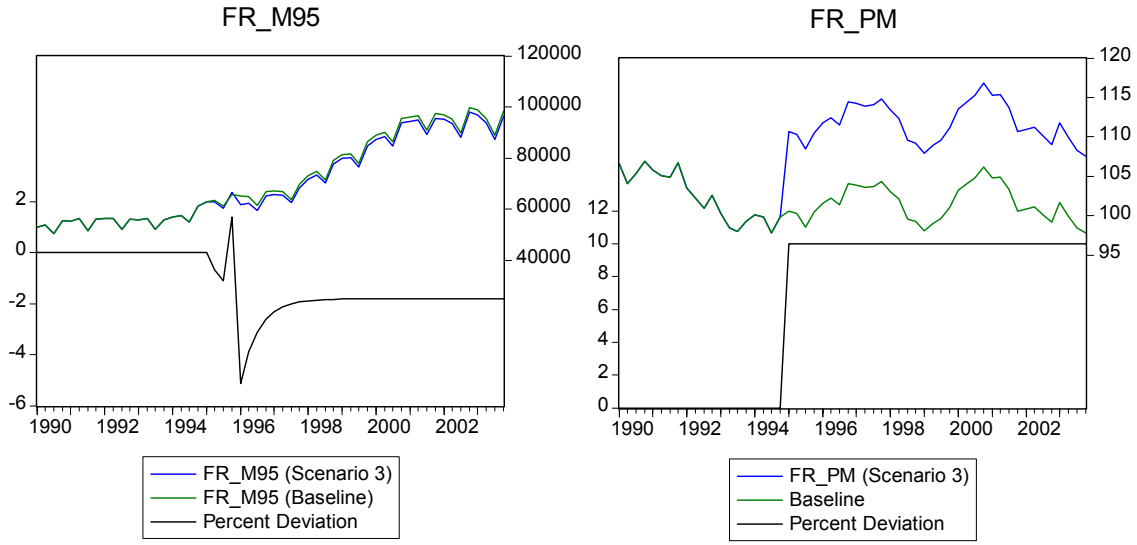
10% increase in French exports of goods and services



10 % increase in the French construction investment (in 1995 prices)



10 % increase in the relative french import prices



A.6. Trend of GDP and Capacity Utilization

Trend of Gross domestic product; at constant prices (1995)

Dependent Variable: FR_GDP95
Method: Least Squares
Date: 05/26/04 Time: 15:48
Sample: 1980:1 2003:4
Included observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	156348.7	2039.428	76.66300	0.0000
Z1	-6353.544	1741.581	-3.648146	0.0004
Z2	-3682.847	1740.872	-2.115518	0.0371
Z3	-15954.40	1740.447	-9.166843	0.0000
@TREND(1970:1)	1440.766	22.22169	64.83602	0.0000

R-squared	0.979319	Mean dependent var	282415.7
Adjusted R-squared	0.978410	S.D. dependent var	41028.97
S.E. of regression	6028.594	Akaike info criterion	20.29709
Sum squared resid	3.31E+09	Schwarz criterion	20.43065
Log likelihood	-969.2605	F-statistic	1077.301
Durbin-Watson stat	0.115735	Prob(F-statistic)	0.000000

Residual tests	***Probability***	***Forecast evaluation (dynamic in-sample)***	
Normality test (Jarque-Bera)	0.089627	Root Mean Squared Error	5103.704
Serial Correlation LM test (lag 1)	0.000000	Mean Absolute Percent Error	0.010286
Serial Correlation LM test (lag 4)	0.000000	Theil inequality coefficient	0.000000
White's heteroscedasticity test	0.006743	Bias proportion	0.005224
RESET test (No. of fitted terms:1)	0.000015	Variance proportion	0.994776
ARCH LM test (lag 1)	0.000000	Covariance proportion	0
ARCH LM test (lag 4)	0.000000		
Stability tests			
CUSUM test			
CUSUM sq. test			

B. Prices, Exchange Rates and Interest Rates

B.1 Price Index: Private Consumption

Price Index: Private consumption expenditure (1995=100)

Dependent Variable: DLOG(FR_PC)
Method: Least Squares
Date: 05/28/04 Time: 09:35
Sample(adjusted): 1982:2 2003:4
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
(log(fr_pc(-1)) -0.698*log(fr_ulc(-1)) -0.204*log(fr_pm(-1) *@trend(1970:2)) -0.051*s8601(-1)-3.1123 +0.017*z1(-1)+0.010*z2(-1) +0.041*z3(-1))	**-0.100843**	**0.018004**	**-5.601272**	**0.0000**
S9601	-0.003226	0.000533	-6.056979	0.0000
I8602	-0.008219	0.002202	-3.732501	0.0004
C	-0.319007	0.057838	-5.515512	0.0000
Z2	-0.017385	0.001658	-10.48663	0.0000
S8601*Z1	0.005756	0.000914	6.296056	0.0000
S8601*Z2	0.022068	0.001818	12.14063	0.0000
S8601*Z3	0.010220	0.001253	8.154645	0.0000
DLOG(FR_PC(-1))-DLOG(FR_PC(-8))	-0.271178	0.023735	-11.42534	0.0000
DLOG(FR_PC(-4)) +DLOG(FR_PC(-5))	0.140457	0.018846	7.452787	0.0000
DLOG(FR_ULC(-4)) - DLOG(FR_ULC(-7))	-0.078364	0.008562	-9.152415	0.0000
DLOG(FR_PM)	0.100946	0.012212	8.266118	0.0000
DLOG(FR_PM(-1)) +DLOG(FR_PM(-2)) +DLOG(FR_PM(-7))	0.034119	0.007181	4.751488	0.0000
D(FR_RS3M(-2))/100-D(FR_RS3M(-3))/100-D(FR_RS3M(-4))/100 +D(FR_RS3M(-5))/100-D(FR_RS3M(-7))/100-D(FR_RS3M(-8))/100	-0.084434	0.010882	-7.758707	0.0000
I8202	0.010722	0.002290	4.682225	0.0000

R-squared	0.965070	Mean dependent var	0.007403
Adjusted R-squared	0.958279	S.D. dependent var	0.009566
S.E. of regression	0.001954	Akaike info criterion	-9.482411
Sum squared resid	0.000275	Schwarz criterion	-9.057254
Log likelihood	427.4849	F-statistic	142.0924
Durbin-Watson stat	2.001879	Prob(F-statistic)	0.000000

In the long-run consumer prices depend mainly on import prices and on the unit labor costs. These also determine the short-run dynamics of the consumer prices. These dynamics also are influenced in France by the short-term interest rate.

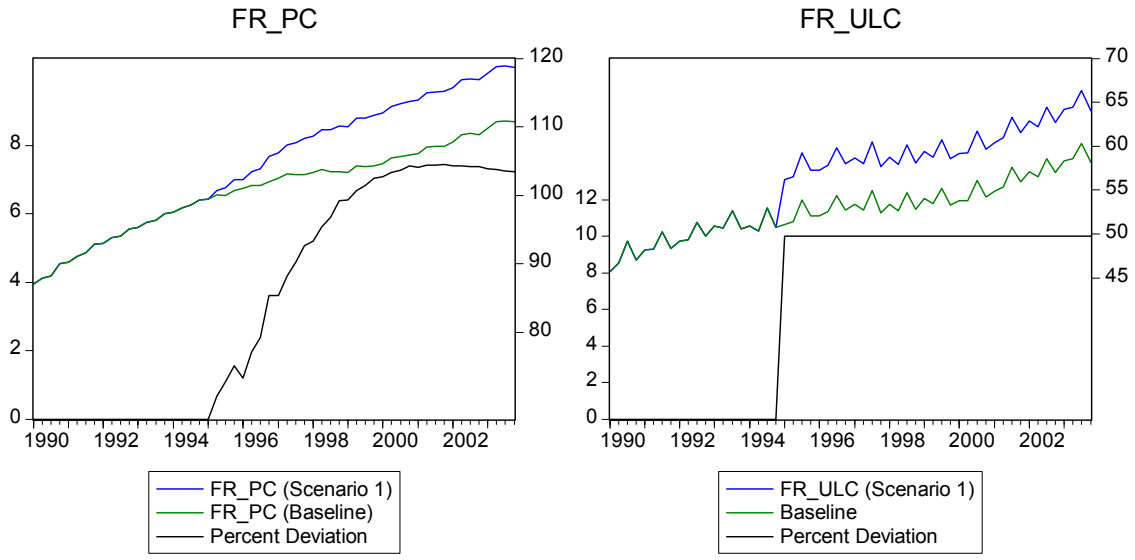
Residual tests	Probability	Forecast evaluation (dynamic in-sample)	
Normality test (Jarque-Bera)	0.218299	Root mean squared error	0.246028
Serial Correlation LM test (lag 1)	0.983965	Mean absolute percent error	0.210201
Serial Correlation LM test (lag 4)	0.790082	Theil inequality coefficient	0.001326
White's heteroscedasticity test	0.027832	Bias proportion	0.013354
ARCH LM test (lag 1)	0.640968	Variance proportion	0.042863
ARCH LM test (lag 4)	0.557414	Covariance proportion	0.943783

Stability tests	
Reset test (lag 1)	0.537822
CUSUM test[a]	0
CUSUM^2 test[a]	0

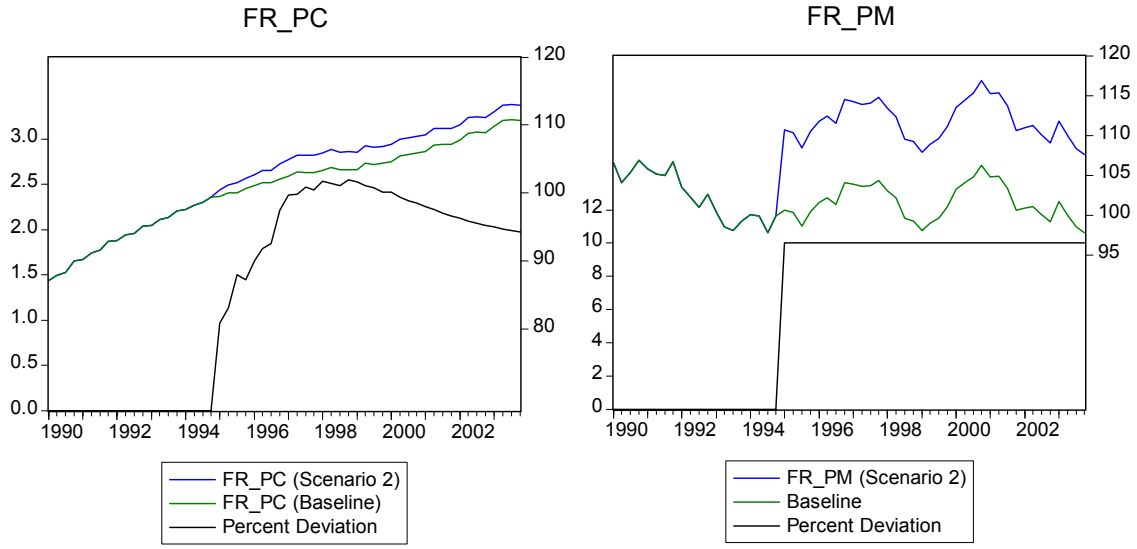
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation properties of the equation

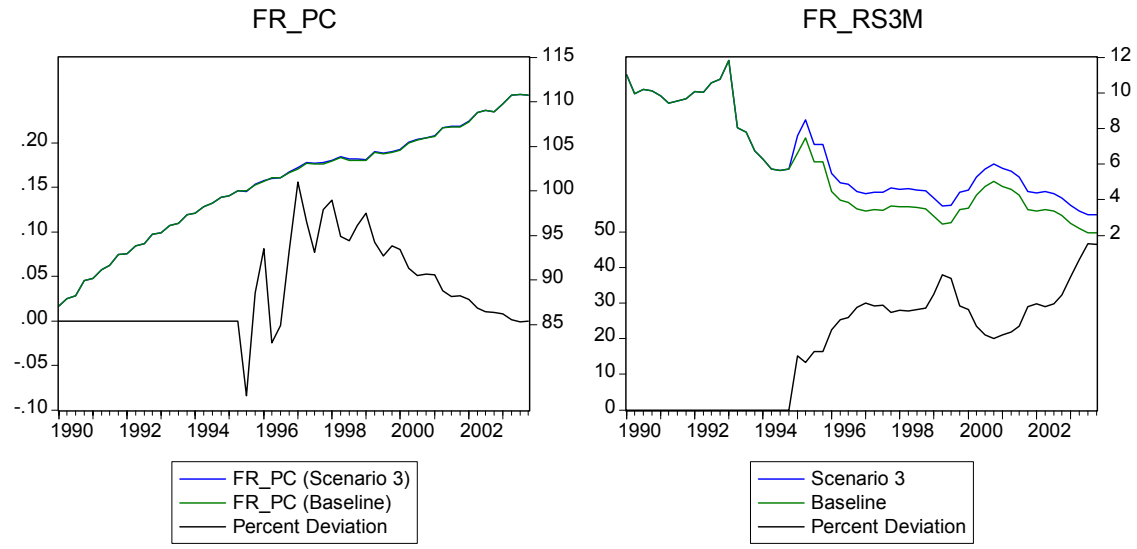
10% increase in the French unit labor costs



10% increase in the French import prices



1% point increase in the nominal short-term (3-months) interest rate



B.2. Price index: Imports

Dependent Variable: DLOG(FR_PM)
Method: Least Squares
Date: 06/01/04 Time: 16:11
Sample(adjusted): 1981Q2 2003Q3
Included observations: 90 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.210946	0.114030	1.849905	0.0681
@TREND(1970:1)	**-0.000852**	**0.000313**	**-2.718420**	**0.0081**
LOG(FR_PM(-1))	**-0.198876**	**0.056725**	**-3.505950**	**0.0008**
LOG(FR_PGESDEF(-1))	**0.154749**	**0.062739**	**2.466565**	**0.0158**
LOG(OIL$(-1) /FR_NAW_US(-1))	**0.017838**	**0.008141**	**2.191156**	**0.0314**
DLOG(FR_REEV_CPI(-1) /FR_PC(-1))	-0.141300	0.077254	-1.829033	0.0712
DLOG(FR_REEV_CPI(-3) /FR_PC(-3))	-0.251243	0.074646	-3.365810	0.0012
DLOG(FR_REEV_CPI(-4) /FR_PC(-4))	0.193860	0.078681	2.463869	0.0159
DLOG(OIL$(-0) /FR_NAW_US(-0))	0.076119	0.009213	8.262460	0.0000
DLOG(OIL$(-2) /FR_NAW_US(-2))	0.015787	0.009033	1.747604	0.0844
DLOG(FR_PM(-4))	0.347436	0.073807	4.707389	0.0000

R-squared	0.723150	Mean dependent var	0.002004
Adjusted R-squared	0.688106	S.D. dependent var	0.020594
S.E. of regression	0.011501	Akaike info criterion	-5.978618
Sum squared resid	0.010450	Schwarz criterion	-5.673086
Log likelihood	280.0378	F-statistic	20.63529
Durbin-Watson stat	1.793380	Prob(F-statistic)	0.000000

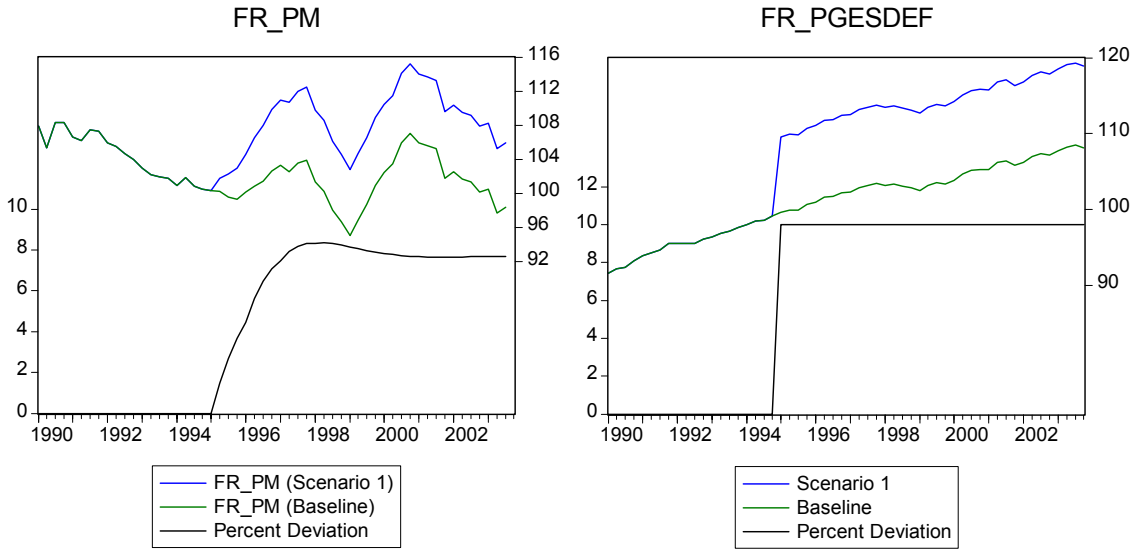
The Frenche import prices are difficult to estimate. We tried a pricing-to-market approach, where import prices depend on both the production costs of the foreign exporters and the production costs for the same products in the importing country. It turned out that the costs of the foreign exporters are insignificant whereas the costs of their competitors are significant with a coefficient of 0.75 indicating that foreign exporters face a high competitive pressure on the French market. Additionally the oil price has a significant influence on French import prices both in the short and in the long run.

Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.502652	Root mean squared error	2.19052
Serial Correlation LM test (lag 1)	0.268153	Mean absolute percent error	1.616389
Serial Correlation LM test (lag 4)	0.333819	Theil inequality coefficient	0.010675
White's heteroscedasticity test	0.018807	Bias proportion	0.000027
ARCH LM test (lag 1)	0.600277	Variance proportion	0.162376
ARCH LM test (lag 4)	0.090481	Covariance proportion	0.837597
Stability tests			
Reset test (lag 1)	0.667149		
CUSUM test[a]	0		
$CUSUM^2$ test[a]	0		

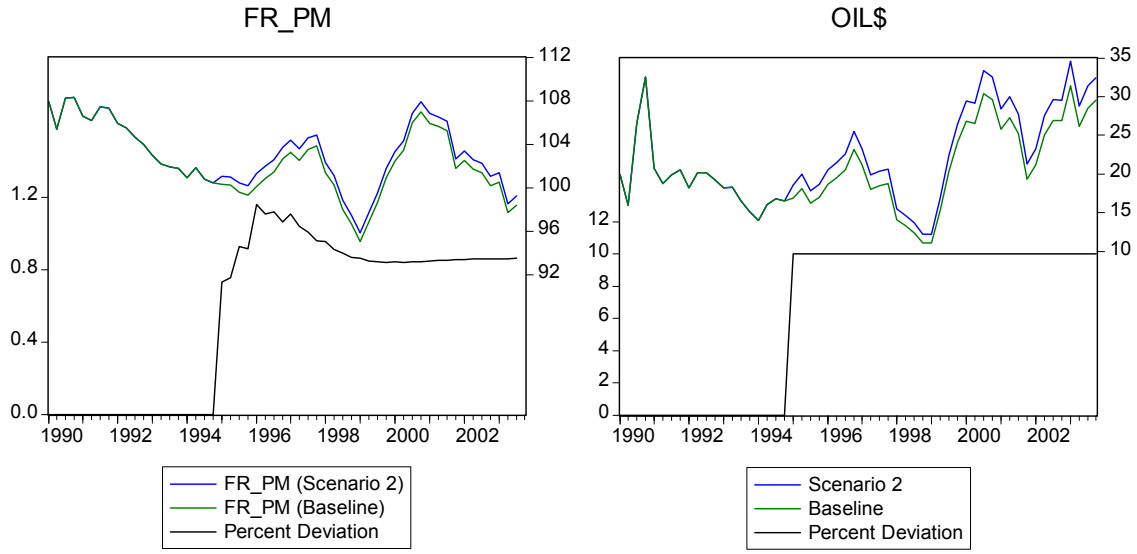
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation Properties of the Equation

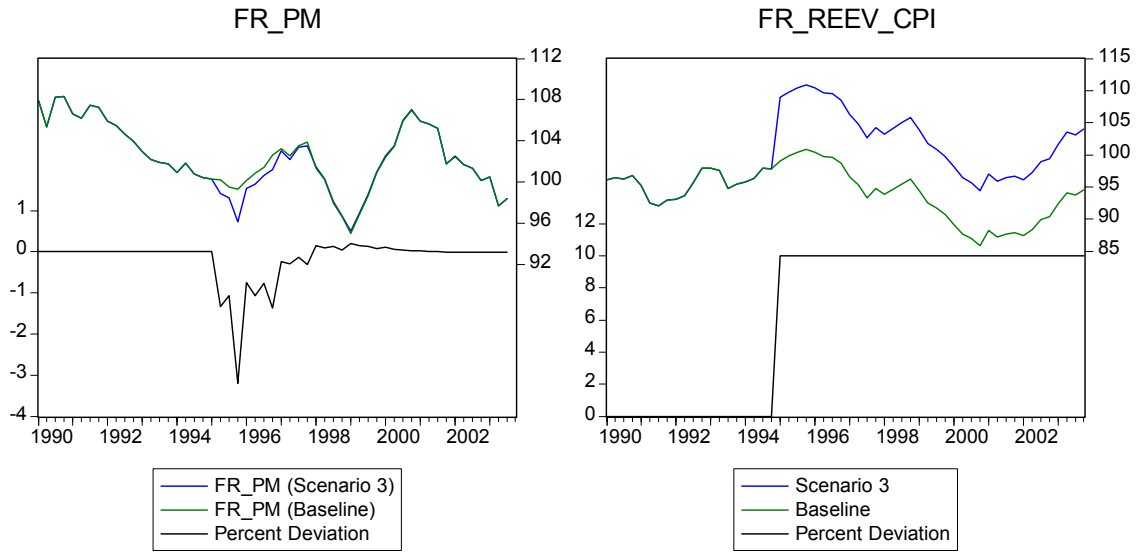
10% increase in the FR_PGESDEF



10% increase in the NL_OIL$



10% increase in the NL_REEV_CPI



B.3. Price index: Exports

Dependent Variable: DLOG(FR_PX)
Method: Least Squares
Date: 05/26/04 Time: 15:53
Sample(adjusted): 1981:2 2003:4
Included observations: 91 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.200751	0.060474	3.319608	0.0014
Z1	-0.003133	0.002233	-1.403171	0.1645
Z2	-0.001247	0.002180	-0.572260	0.5688
Z3	-0.007480	0.002316	-3.230006	0.0018
LOG(FR_PX(-1))	**-0.130928**	**0.031488**	**-4.158044**	**0.0001**
LOG(FR_PM(-1))	**0.088012**	**0.030605**	**2.875691**	**0.0052**
DLOG(FR_PX(-1))	-0.234673	0.084230	-2.786104	0.0067
DLOG(FR_PX(-2))	-0.113208	0.065710	-1.722836	0.0889
DLOG(FR_PX(-4))	0.347167	0.067173	5.168256	0.0000
DLOG(FR_PM)	0.367554	0.044292	8.298351	0.0000
DLOG(FR_PM(-1))	0.157948	0.051569	3.062859	0.0030
DLOG(FR_CPI(-0) /FR_REEV_CPI(-0))	0.091031	0.049362	1.844167	0.0690
DLOG(FR_PGESDEF(-4))	-0.378706	0.160627	-2.357669	0.0209

R-squared	0.833940	Mean dependent var	0.003826
Adjusted R-squared	0.808392	S.D. dependent var	0.014448
S.E. of regression	0.006324	Akaike info criterion	-7.157292
Sum squared resid	0.003120	Schwarz criterion	-6.798597
Log likelihood	338.6568	F-statistic	32.64251
Durbin-Watson stat	2.209124	Prob(F-statistic)	0.000000

In the long run export prices are principally determined by French import prices. In the short run dynamics of the system other price variables as the GDP deflator and the ratio of the consumer price index to the real external value of the French franc.

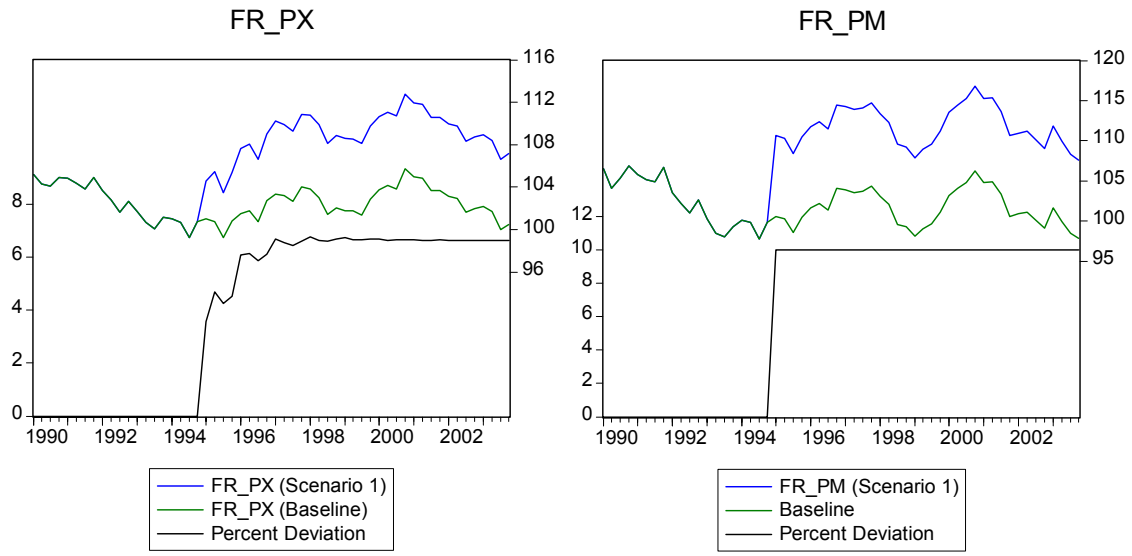
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.81487	Root mean squared error	1.081906
Serial Correlation LM test (lag 1)	0.035541	Mean absolute percent error	0.837981
Serial Correlation LM test (lag 4)	0.289877	Theil inequality coefficient	0.005419
White's heteroscedasticity test	0.337079	Bias proportion	0.006805
ARCH LM test (lag 1)	0.588492	Variance proportion	0.013296
ARCH LM test (lag 4)	0.589852	Covariance proportion	0.979899

Stability tests	
Reset test (lag 1)	0.150145
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation Properties of the Equation

10% increase in the NL_PGESDEF



B.4. Price index: Government expenditures and investments

Dependent Variable: DLOG(FR_PGI)
Method: Least Squares
Date: 05/26/04 Time: 15:52
Sample(adjusted): 1981:4 2003:4
Included observations: 89 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.346990	0.042357	8.191978	0.0000
Z1	0.016667	0.003984	4.183305	0.0001
Z2	0.013304	0.002758	4.823580	0.0000
Z3	0.019718	0.004871	4.047722	0.0001
LOG(FR_PGI(-1))	**-0.192542**	**0.038864**	**-4.954226**	**0.0000**
LOG(FR_ULC(-1))	**0.137847**	**0.036873**	**3.738426**	**0.0003**
DLOG(FR_PM)	0.058567	0.030918	1.894255	0.0619
DLOG(FR_PGI(-6))	-0.343292	0.093566	-3.668985	0.0004
DLOG(FR_PM(-3))	0.101731	0.029983	3.392912	0.0011
DLOG(FR_ULC(-4))	-0.082702	0.051383	-1.609535	0.1115

R-squared	0.704408	Mean dependent var	0.006571
Adjusted R-squared	0.670733	S.D. dependent var	0.009217
S.E. of regression	0.005289	Akaike info criterion	-7.540940
Sum squared resid	0.002210	Schwarz criterion	-7.261318
Log likelihood	345.5718	F-statistic	20.91781
Durbin-Watson stat	1.919274	Prob(F-statistic)	0.000000

At the moment a joint deflator for government consumption and overall investment is used in the model. Because of the high weight of wages in government consumption they are the only explaining variable for this price index in the long run. In the short run import prices also influence the estimated price index.

Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.786119	Root mean squared error	0.758869
Serial Correlation LM test (lag 1)	0.862632	Mean absolute percent error	0.662002
Serial Correlation LM test (lag 4)	0.253214	Theil inequality coefficient	0.004035
White's heteroscedasticity test	0.018549	Bias proportion	0.000575
ARCH LM test (lag 1)	0.671754	Variance proportion	0.009083
ARCH LM test (lag 4)	0.671754	Covariance proportion	0.990342

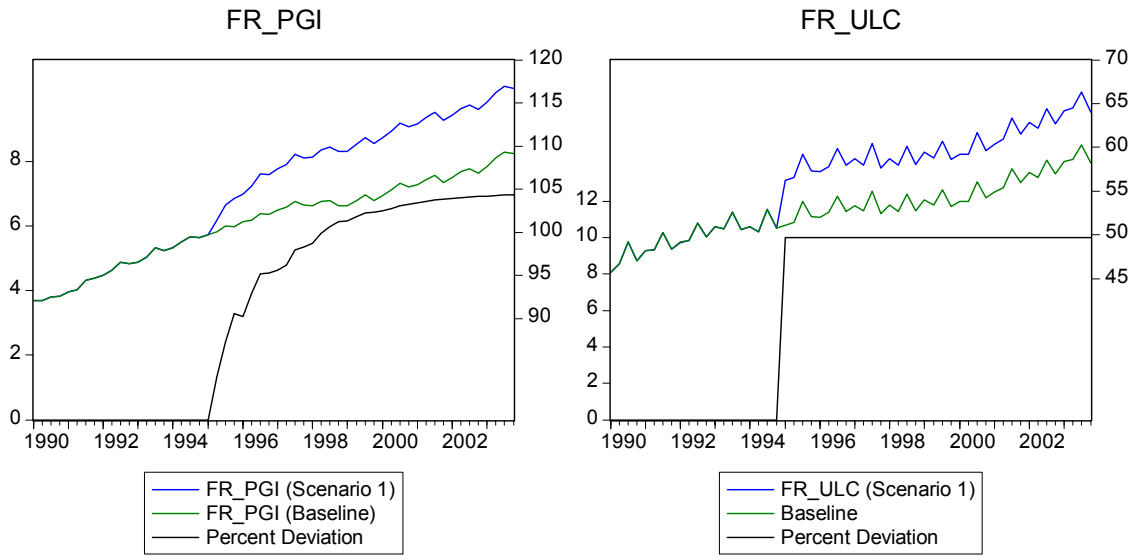
Stability tests	
Reset test (lag 1)	0.00989
CUSUM test[a]	1988-1996
$CUSUM^2$ test[a]	1988-1994

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Methodology of computation of the PGI: PGI = (CGOV+I)/(CGOV95+I95)*100

Simulation Properties of the Equation

10% increase in the French unit labor costs



B.5. Spread of Interest Rates

Dependent Variable: FR_SPREAD
Method: Least Squares
Date: 05/26/04 Time: 15:56
Sample(adjusted): 1982:3 2003:3
Included observations: 85 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.725853	0.171036	4.243854	0.0001
I93	-1.987207	0.338294	-5.874197	0.0000
FR_SPREAD(-1)	0.727221	0.055254	13.16133	0.0000
D(US_SPREAD(-1))	0.312754	0.092099	3.395834	0.0011
FR_RS3M	-0.170312	0.038175	-4.461394	0.0000
D(FR_PC(-1)+FR_PC(-2))	0.234841	0.088279	2.660204	0.0095
D(FR_PC(-3)+FR_PC)	0.348797	0.082467	4.229552	0.0001

R-squared	0.877460	Mean dependent var	0.781882
Adjusted R-squared	0.868034	S.D. dependent var	1.235392
S.E. of regression	0.448782	Akaike info criterion	1.314205
Sum squared resid	15.70962	Schwarz criterion	1.515365
Log likelihood	-48.85372	F-statistic	93.08804
Durbin-Watson stat	1.378897	Prob(F-statistic)	0.000000

Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.14475	Root mean squared error	0.771288
Serial Correlation LM test (lag 1)	0.001864	Mean absolute percent error	71.08027
Serial Correlation LM test (lag 4)	0.017054	Theil inequality coefficient	0.285556
White's heteroscedasticity test	0.173027	Bias proportion	0.000744
ARCH LM test (lag 1)	0.698042	Variance proportion	0.098837
ARCH LM test (lag 4)	0.212108	Covariance proportion	0.900419

Stability tests	
Reset test (lag 1)	0.781392
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

B.4. Real External Value of French franc in relation to the Currencies of the EMU Member Countries:

$$REXVAL_{EMU} = \frac{CPI_{FR}}{CPI_{DE}} \times \frac{DM}{FFR} \times w_{DE} + \frac{CPI_{FR}}{CPI_{IT}} \times \frac{LIT}{FFR} \times w_{IT} + \frac{CPI_{FR}}{CPI_{ES}} \times \frac{PTA}{FFR} \times w_{PT}$$
$$+ \frac{CPI_{FR}}{CPI_{PT}} \times \frac{ESC}{FFR} \times w_{ES} + \frac{CPI_{FR}}{CPI_{NL}} \times \frac{HFL}{FFR} \times w_{NL} + \frac{CPI_{FR}}{CPI_{BE}} \times \frac{BFR}{FFR} \times w_{BE}$$
$$+ \frac{CPI_{FR}}{CPI_{FI}} \times \frac{FMK}{FFR} \times w_{FI} + \frac{CPI_{FR}}{CPI_{AT}} \times \frac{SHL}{FFR} \times w_{AT} + \frac{CPI_{FR}}{CPI_{IE}} \times \frac{IPF}{FFR} \times w_{IE}$$

$\frac{CPI_{FR}}{CPI_{DE}}$ = relative consumer prices France/Germany

$\frac{CPI_{FR}}{CPI_{IT}}$ = relative consumer prices France/Italy

$\vdots$

$\frac{DM}{FFR}$ = nominal external value of French franc in relation to DM

$\frac{LIT}{FFR}$ = nominal external value of French franc in relation to Lira

$\vdots$

C. Income and Employment

C.1. Consumption of Fixed Capital

Consumption of fixed capital

Dependent Variable: LOG(FR_CFC)
Method: Least Squares
Date: 08/16/04 Time: 11:42
Sample(adjusted): 1981:4 2003:4
Included observations: 89 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.184253	0.035967	5.122821	0.0000
Z1	0.000678	0.000340	1.993569	0.0498
Z2	0.000215	0.000305	0.704107	0.4835
Z3	0.000729	0.000345	2.116728	0.0376
@TREND(1970:1)	0.000147	3.34E-05	4.405201	0.0000
LOG(.035*FR_IMEQ95 *FR_PGDP/100 +0.02*FR_ICON95*FR_PGDP/ 100)	**0.010892**	**0.002613**	**4.168041**	**0.0001**
LOG(FR_CFC(-1))	2.413612	0.098703	24.45317	0.0000
LOG(FR_CFC(-2))	-1.993607	0.226897	-8.786409	0.0000
LOG(FR_CFC(-3))	0.563748	0.245710	2.294362	0.0245
LOG(FR_CFC(-4))	-0.736294	0.238258	-3.090318	0.0028
LOG(FR_CFC(-5))	1.777737	0.241006	7.376319	0.0000
LOG(FR_CFC(-6))	-1.486795	0.207735	-7.157175	0.0000
LOG(FR_CFC(-7))	0.435453	0.078792	5.526600	0.0000

R-squared	0.999992	Mean dependent var	10.47454
Adjusted R-squared	0.999990	S.D. dependent var	0.319098
S.E. of regression	0.000992	Akaike info criterion	-10.85912
Sum squared resid	7.48E-05	Schwarz criterion	-10.49561
Log likelihood	496.2308	F-statistic	758530.7
Durbin-Watson stat	2.000958	Prob(F-statistic)	0.000000

Consumption of fixed capital (cfc) or depreciation is estimated according to the calculation of cfc in the NAS. Therefore the investment in machinery and equipment, the fixed capital formation and the construction investment, all of them at current prices, are used as the base to estimate the cfc.

Residual tests	***Probability***	***Forecast evaluation (dynamic in-sample)***	
Normality test (Jarque-Bera)	0.000000	Root Mean Squared Error	317.1064
Serial Correlation LM test (lag 1)	0.978360	Mean Absolute Percent Error	0.490387
Serial Correlation LM test (lag 4)	0.004930	Theil inequality coefficient	0.004089
White's heteroscedasticity test	0.000373	Bias proportion	0.011492
RESET test (No. of fitted terms:1)	0.219593	Variance proportion	0.014499
ARCH LM test (lag 1)	0.047892	Covariance proportion	0.974009
ARCH LM test (lag 4)	0.000858		
Stability tests			
CUSUM test			
CUSUM sq. test			

C.2. Income

Gross wages (per person)

Dependent Variable: DLOG(FR_GWAGEE)
Method: Least Squares
Date: 07/29/04 Time: 13:56
Sample(adjusted): 1982:2 2003:4
Included observations: 87 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FR_GWAGEE(-1))	**-0.872758**	**0.058244**	**-14.98441**	**0.0000**
LOG(FR_PC(-1))	**0.589527**	**0.045501**	**12.95646**	**0.0000**
LOG(FR_PRODEE(-1))	**0.646673**	**0.052757**	**12.25754**	**0.0000**
FR_UR(-1)/100	**-1.008787**	**0.070661**	**-14.27649**	**0.0000**
@TREND(1970:1)	**0.001129**	**0.000103**	**11.00206**	**0.0000**
S8601	-0.005133	0.001744	-2.942677	0.0045
C	-1.375313	0.303549	-4.530772	0.0000
Z1*S9801	0.015242	0.001420	10.73673	0.0000
Z3*S9801	-0.005710	0.001542	-3.703551	0.0004
DLOG(FR_GWAGEE(-2))-DLOG(FR_GWAGEE(-6))	0.153112	0.035022	4.371895	0.0000
DLOG(FR_PC(-1))+DLOG(FR_PC(-2))+DLOG(FR_PC(-3))	-0.511681	0.055175	-9.273835	0.0000
DLOG(FR_PC(-4))	-0.217388	0.057573	-3.775847	0.0004
DLOG(FR_PC(-6))	0.138402	0.043480	3.183108	0.0022
DLOG(FR_PC(-7))	0.198533	0.046240	4.293519	0.0001
DLOG(FR_PRODEE(-1))+DLOG(FR_PRODEE(-2))+DLOG(FR_PRODEE(-3))+DLOG(FR_PRODEE(-4))+DLOG(FR_PRODEE(-5))	-0.638549	0.058060	-10.99810	0.0000
DLOG(FR_PRODEE(-6))	-0.469401	0.044963	-10.43965	0.0000
DLOG(FR_PRODEE(-7))	-0.297585	0.040055	-7.429468	0.0000
DLOG(FR_PRODEE(-8))	-0.138960	0.032304	-4.301693	0.0001
D(FR_UR(-1))+D(FR_UR(-3))+D(FR_UR(-8))	0.009345	0.001170	7.989148	0.0000
D(FR_UR(-6))	0.012089	0.001563	7.735009	0.0000
I8904	0.007428	0.002294	3.238573	0.0019
I9001	-0.008479	0.002266	-3.741657	0.0004
I8601	0.007921	0.002488	3.183305	0.0022

R-squared	0.952732	Mean dependent var	0.008947
Adjusted R-squared	0.936484	S.D. dependent var	0.008226
S.E. of regression	0.002073	Akaike info criterion	-9.297696
Sum squared resid	0.000275	Schwarz criterion	-8.645789
Log likelihood	427.4498	F-statistic	58.63588
Durbin-Watson stat	1.953878	Prob(F-statistic)	0.000000

In the long-run the gross wages per employees depend on the prices, the productivity and the unemployment rate: ln(gwagee) = 0.676ln(pc) +0.741*ln(prodee) –0.009*ur.

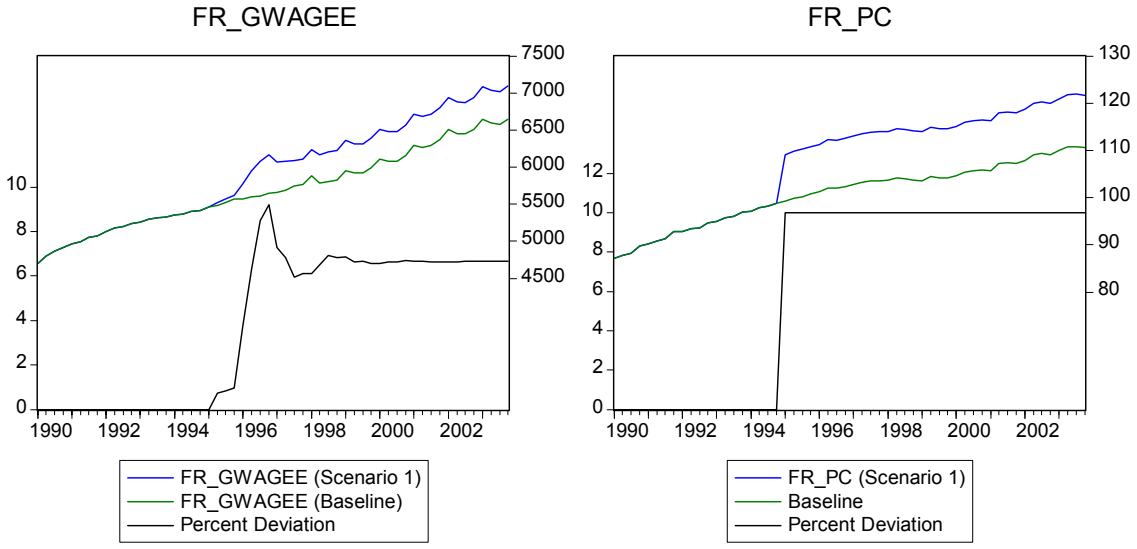
Residual tests	Probability	Forecast evaluation (dynamic in-sample)	
Normality test (Jarque-Bera)	0.277173	Root mean squared error	9.644213
Serial Correlation LM test (lag 1)	0.945509	Mean absolute percent error	0.149656
Serial Correlation LM test (lag 4)	0.218917	Theil inequality coefficient	0.000932
White's heteroscedasticity test	0.205071	Bias proportion	0.000002
ARCH LM test (lag 1)	0.745055	Variance proportion	0.000023
ARCH LM test (lag 4)	0.509598	Covariance proportion	0.999974

Stability tests	
Reset test (lag 1)	0.533981
CUSUM test[a]	0
CUSUM^2 test[a]	0

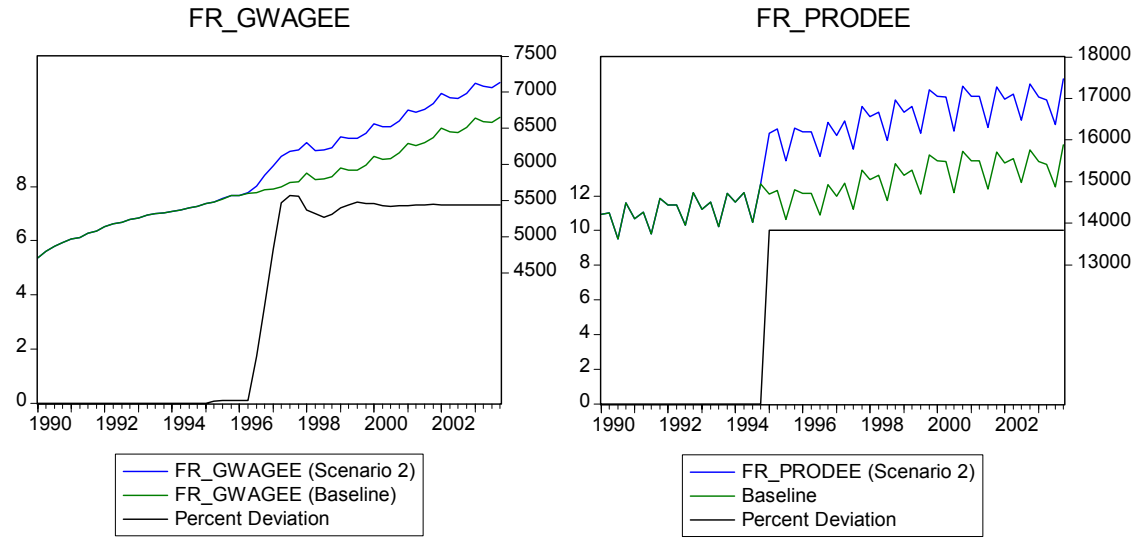
[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation Properties of the equation

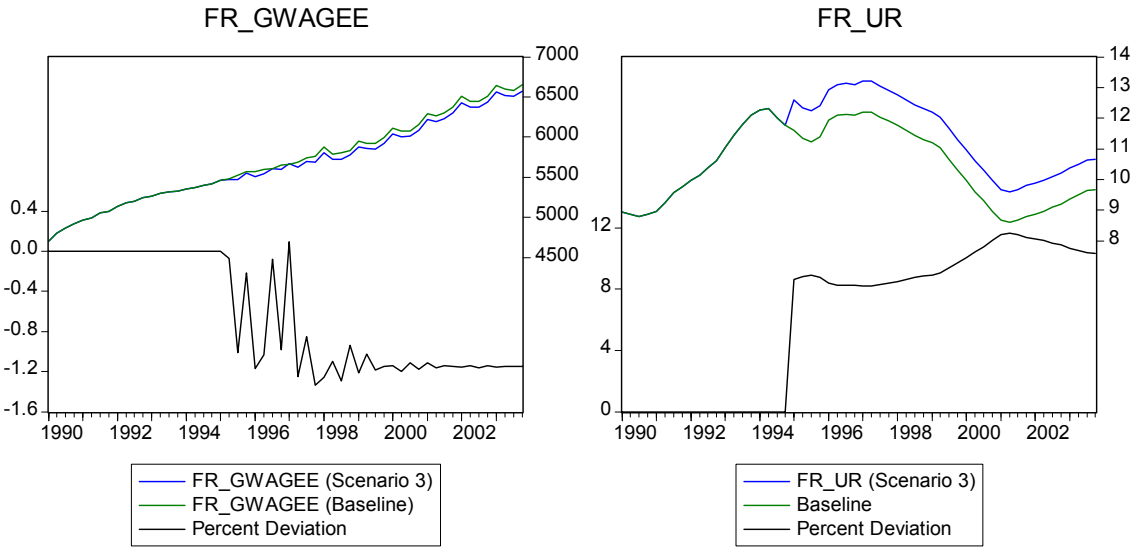
10% increase in the Consumer Price Index



10% increase in the productivity



10% increase in the unemployment rate



C.3. Employment

Employees
(Domestic concept, in 1000)

Dependent Variable: DLOG(FR_EE)
Method: Least Squares
Date: 05/26/04 Time: 13:55
Sample(adjusted): 1982:1 2003:4
Included observations: 88 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(FR_EE(-1))	**-0.135367**	**0.022575**	**-5.996439**	**0.0000**
LOG(FR_GDP95(-1))	**0.080372**	**0.017337**	**4.635928**	**0.0000**
S9101	-0.023505	0.004379	-5.368193	0.0000
@TREND(1970:1)	**-0.000240**	**6.91E-05**	**-3.474455**	**0.0009**
@TREND(1970:1)*S9101	**0.000267**	**5.18E-05**	**5.149823**	**0.0000**
C	0.351314	0.069426	5.060232	0.0000
Z2	0.004622	0.001028	4.494689	0.0000
I8402	-0.002418	0.000768	-3.148266	0.0024
I9101(-2)	0.002953	0.000801	3.687897	0.0004
DLOG(FR_EE(-1))	1.222068	0.066343	18.42051	0.0000
DLOG(FR_EE(-2))	-0.762128	0.093791	-8.125805	0.0000
DLOG(FR_EE(-3))	0.602778	0.097945	6.154230	0.0000
DLOG(FR_EE(-4))	-0.317960	0.066558	-4.777177	0.0000
DLOG(FR_EE(-7))	0.199814	0.043857	4.556063	0.0000
DLOG(FR_GDP95(-1))	-0.037635	0.013382	-2.812397	0.0063
DLOG(FR_GDP95(-6))	-0.028717	0.011946	-2.403789	0.0188

R-squared	0.972107	Mean dependent var	0.002287
Adjusted R-squared	0.966296	S.D. dependent var	0.003909
S.E. of regression	0.000718	Akaike info criterion	-11.47815
Sum squared resid	3.71E-05	Schwarz criterion	-11.02773
Log likelihood	521.0387	F-statistic	167.2882
Durbin-Watson stat	1.928885	Prob(F-statistic)	0.000000

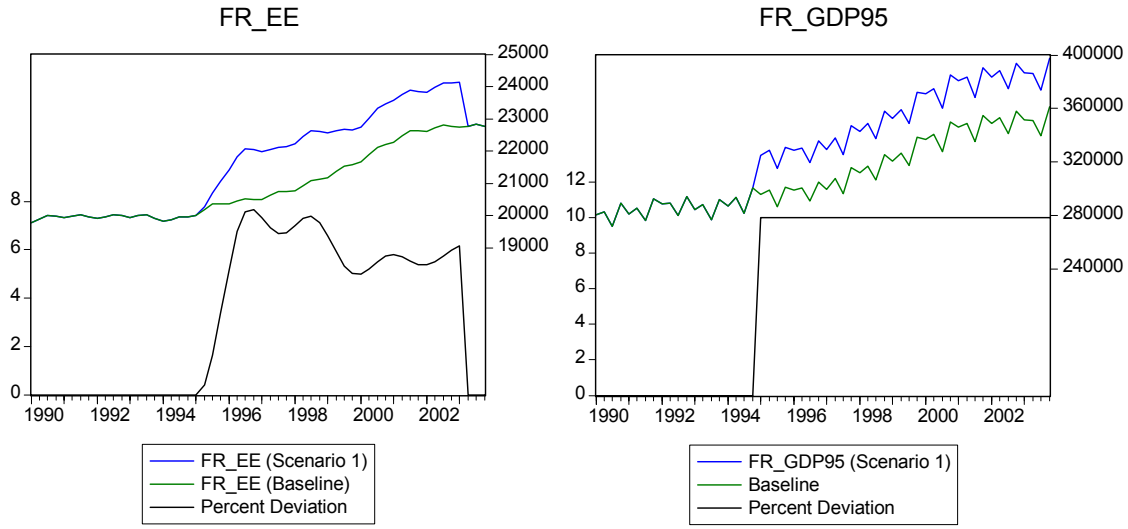
In the long-run, employment depends on real GDP: ln(ee) = 0.594*ln(gdp95) – 0.0002*trend(1970:1) +0.0002 trend(1970:1)*S9101.

Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.789784	Root mean squared error	58.48935
Serial Correlation LM test (lag 1)	0.668112	Mean absolute percent error	0.228174
Serial Correlation LM test (lag 4)	0.390114	Theil inequality coefficient	0.001444
White's heteroscedasticity test	0.305043	Bias proportion	0.000939
ARCH LM test (lag 1)	0.082785	Variance proportion	0.000486
ARCH LM test (lag 4)	0.496232	Covariance proportion	0.998575
Stability tests			
Reset test (lag 1)	0.047054		
CUSUM test[a]	0		
$CUSUM^2$ test[a]	0		

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation properties of the equation

10% increase in the french real GDP



Unemployed Persons
(domestic concept, in 1000)

Dependent Variable: LOG(FR_U)
Method: Least Squares
Date: 05/26/04 Time: 15:56
Sample(adjusted): 1981:2 2003:4
Included observations: 91 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.202023	0.069830	2.893060	0.0049
H35	-0.001040	0.003659	-0.284207	0.7770
LOG(FR_U(-1))	0.975495	0.008889	109.7454	0.0000
DLOG(FR_U(-1))	0.469046	0.081193	5.776955	0.0000
DLOG(FR_U(-4))	-0.205218	0.075120	-2.731883	0.0077
DLOG(FR_EE(-1) +FR_EE(-2)+FR_EE(-3))	-2.857317	0.877520	-3.256127	0.0016
DLOG(FR_CAPA +FR_CAPA(-1) +FR_CAPA(-2))	-1.154193	0.434728	-2.654974	0.0095

R-squared	0.993356	Mean dependent var	7.841656
Adjusted R-squared	0.992882	S.D. dependent var	0.144558
S.E. of regression	0.012196	Akaike info criterion	-5.901576
Sum squared resid	0.012495	Schwarz criterion	-5.708433
Log likelihood	275.5217	F-statistic	2093.293
Durbin-Watson stat	2.050046	Prob(F-statistic)	0.000000

In the long-term the level of unemployment in an economy depends mainly (and by definition) on the level of employment. In the short term, the capacity utilization in the French economy also influences the level of unemployment.

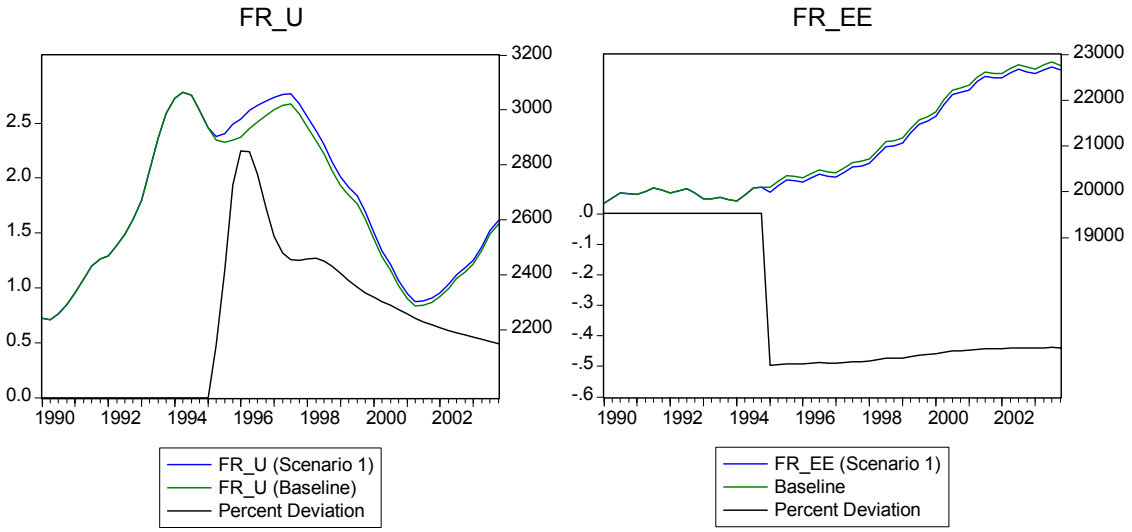
Residual tests	**Probability**	**Forecast evaluation (dynamic in-sample)**	
Normality test (Jarque-Bera)	0.000001	Root mean squared error	94.99626
Serial Correlation LM test (lag 1)	0.685647	Mean absolute percent error	3.189133
Serial Correlation LM test (lag 4)	0.045909	Theil inequality coefficient	0.018275
White's heteroscedasticity test	0.529873	Bias proportion	0.012389
ARCH LM test (lag 1)	0.843888	Variance proportion	0.059062
ARCH LM test (lag 4)	0.079785	Covariance proportion	0.928549

Stability tests	
Reset test (lag 1)	0.712257
CUSUM test[a]	0
$CUSUM^2$ test[a]	0

[a] Number of quarters where the cumulative sum goes outside the area between the 5% critical lines.

Simulation properties of the equation

100.000 less employed



Definitions

Gross Domestic Product

fr_gdp = fr_c*fr_pc/100 + (fr_cgov95 + fr_i95)*fr_pgi/100 +
fr_x95*fr_px/100 – fr_m95*fr_pm/100

GDP Deflator

fr_pgdp = fr_gdp/fr_gdp95*100

Demand aggregates

fr_iend95 = fr_gdp95 + fr_m95 - fr_x95
fr_end95 = fr_gdp95 + fr_m95
fr_n95 = fr_c95 + fr_ifc95 + fr_is95 + fr_x95
fr_md95 = fr_ifc95 + fr_x95

Unit labour costs

fr_ulc = fr_gyee / fr_gdp95 * 100

Real unit labour costs

fr_ulc95 = fr_gyee / fr_gdp * 100

Long-term interest rate

fr_rl5y = fr_rs3m + fr_spread

Savings private households

fr_s = log (fr_y95) – log (fr_c95)

Wealth private households

fr_w = fr_s + fr_w(-1)

Other variables

fr_gdp95t=fr_gdp95-fr_resid02_gdp95
fr_capa = (fr_gdp95 / fr_gdp95t) * 100
fr_x = fr_x95 * fr_px/100
fr_pxs = (fr_x - fr_pxg * fr_xg95/100)/fr_xs95*100
fr_gyprop = fr_gdp - fr_cfc - fr_tind - fr_gwage
fr_xs95 = fr_x95 - fr_xg95
fr_xg95_row = fr_xg95 - fr_xg95_ewu
fr_ifc95_s = fr_icon95 + fr_imeq95
fr_gdp95_s = fr_c95 + fr_cgov95 + fr_ifc95 + fr_is95 + fr_x95 - fr_m95
fr_gdp = fr_gdp95 * fr_pgdp / 100
fr_pgi = (fr_gdp - fr_pc * fr_c95 / 100 - fr_px * fr_x95 / 100 + fr_pm * fr_m95 / 100)
/(fr_cgov95 + fr_ifc95 + fr_is95) * 100
fr_y = fr_gyee + fr_gyprop
fr_gwage95 = fr_gwage/fr_pc *100
fr_y95 = (fr_y / fr_pc) * 100
fr_gwage = fr_gwagee*fr_ee/1000
fr_gyee=fr_gwage+fr_tssem
fr_u=(fr_ur/100*fr_et)/(1-fr_ur/100)
fr_relp = fr_pm / fr_pgdp
fr_spread = fr_rl5y - fr_rs3m
fr_rrl5y = fr_rl5y - ((fr_pc - fr_pc(-4)) / fr_pc(-4)) * 100
fr_gyeee = fr_gyee/fr_ee*1000
fr_gyeee95 = fr_gyeee/fr_pgdp*100
fr_gwagee95 = fr_gwagee/fr_pgdp*100
fr_prodee = fr_gdp95/fr_ee*1000
fr_wedge = (fr_gyeee-fr_gwagee)/fr_gwagee

IV. Documentation

A. Variables and Data Sources

DE_SPREAD	Zinsspread Detschland	Spread of interest rates
EU8OFR_GDP95	GDP; Europäische Länder ohne Frankreich; zu konstanten Preisen	GDP; European countries excluding France
EU8OFR_IFC95	Bruttoanlageinvestitionen; Europäische Länder ohne Frankreich; zu konstanten Preisen	Investment on fixed capital; European countries excluding France
EU8OFR_X95	Exporte; Europäische Länder ohne Frankreich; zu konstanten Preisen	Exports; European countries excluding France
FR_C95	Private Konsumausgaben;zu konst.Preisen	Private consumption expenditure;at const. prices
FR_CAPA	Gesamtwirtschaftl.Kapazitätsauslastung	Capacity utilisation,total economy
FR_CFC	Abschreibungen	Consumption of fixed capital
FR_CGOV95	Konsumausgaben des Staates;zu konst.Preisen	Government consumption;at const. Prices
FR_EE	Arbeitnehmer im Inland	Employees (domestic concept)
FR_END95	Endnachfrage; zu konst. Preisen	Final demand;at constant prices
FR_ES	Selbständige	Self employed persons
FR_ET	Erwerbstätige im Inland	Persons engaged (domestic concept)
FR_GDP	Bruttoinlandsprodukt	Gross domestic product
FR_GDP95	Bruttoinlandsprodukt;zu konst.Preisen	Gross domestic product at constant prices
FR_GWAGE	Arbeitnehmerentgelte,Inlandskonzept	Compensation of employees, domestic concept
FR_GWAGEE	Arbeitnehmerentgelte pro Kopf, Inlandskonzept	Compensation of employees, per worker, domestic concept
NL_GWAGE95	Arbeitnehmerentgelte pro Kopf, Inlandskonzept, zu konstanten Preisen	Compensation of employees, per worker, domestic concept (real)
FR_GYPROP	Unternehmens- u.Vermögenseinkommen(brutto)	Operating surplus and mixed income (gross)
FR_ICON95	Bruttoanlageinvestionen,Bauten;zu konst.Preisen	Gross fixed capital formation;construction;at const. Prices
FR_IEND95	Gesamtnachfrage;zu konst.Preisen	Total demand;at const. Prices
FR_IFC95	Bruttoanlageinvestionen;zu konst.Preisen	Gross fixed capital formation;at const. Prices
FR_IMEQ95	Ausrüstungen;zu konst.Preisen	Equipment;at const. prices
FR_IS95	Vorratsveränd.u.Nettozug.an Werts.;zu konst.Preisen	Change in stocks and net additions to valuables ;at const. prices
FR_M95	Einfuhr;zu konst.Preisen	Imports;at const. prices
FR_MD95	FR_IFC95 + FR_X95	
FR_NAW_US	nom. Außenwert des FR franc gegenüber den Währ. der EWU	Nominal external value of the French francs in rel. to the curr. of the EMU memb. countr.
FR_PC	Preisindex privater Konsum	Price index private consumption (1995=100)
FR_PGI	Preisindex Staatsverbrauch + Investitionen	Price index government consumption + investment (1995=100)
FR_PGDP	Preisindex;Bruttoinlandsprodukt	Price index;Gross domestic product (1995=100)
FR_PGESDEF	Preisindex; GDP Deflator	Price index; GDP Deflator (1995=100)
FR_PM	Preisindex;Einfuhr	Price index;imports (1995=100)
FR_PRODEE	Produktivität (je abh. Erwerbstätigen)	Produktivity (per employee)
FR_PX	Preisindex;Ausfuhr	Price index;exports (1995=100)
FR_REEV_CPI	real. Außenwert des FRF gegenüber den Währ. der EWU	Real external value of the dutch florins in rel. to the curr. of the EMU memb. countr.

FR_REEV_EWU	real. Außenwert des NGL gegenüber den Währ. der EWU	Real external value of the dutch florins in rel. to the curr. of the EMU memb. countr.
FR_RELP	Relative Importpreisen	Relative import prices
FR_RL5Y	Kapitalmarktzinsen (5 Jahre)	Long term interest rate (5 years)
FR_RRL5Y	Kapitalmarktzinsen (5 Jahre) (real)	Long term interest rate (5 years) (real)
FR_RS3M	Geldmarktzinsen (3 Monate)	Short term interest rate (3 months)
FR_S	Ersparnisse pr. Haushalte	Savings privat households
FR_SPREAD	Zinsspread	Spread interest rates
FR_TIND	Produktions-und Importabgaben	Levy on production and import
FR_TIND95	Produktions-und Importabgaben (real)	Levy on production and import (real)
FR_U	Arbeitslose	Unemployed persons
FR_ULC	Lohnstückkosten,Inlandskonzept (ber.)	Unit labour costs,domestic concept(adj.)
FR_UR	Arbeitslosenrate	Unemployment rate
FR_W	kumulierte Ersparnisse (Vermögen)	Cumulated savings private households (wealth)
FR_X95	Ausfuhr;zu konst.Preisen	Exports;at const. prices
FR_XG95	Ausfuhr,Waren; zu konstanten Preisen	Exports,goods (real)
FR_XG95_EWU	französische Warenexporte in die EWU;zu konst.Preisen	French exports to the EMU; at const. Prices
FR_XG95_ROW	Französische Warenexporte in den Rest der Welt;zu konst.Preisen	French exports to the rest of the world; at const. prices
FR_XS95	Ausfuhr,Dienstleistungen;zu konst.Preisen	Exports,services;at const. prices
FR_Y	Volkseinkommen	National income
FR_Y95	Volkseinkommen; zu konstanten Preisen	National income, real
Oil$	Öl-Barrel-Preis	Oil barrel price, in US $
ROW_GDP95	Bruttoinlandsprodukt; Rest der Welt; zu konstanten Preisen	GDP, Rest of the
FR_N95	fr_c95 + fr_ifc95 + fr_is95 + fr_x95	
Fr_TSSEM	Beiträge der Arbeitgeber zur Sozialversicherung	Social security contribution of employers

Dummies: Dummies:

z1..... z3	Saison-Dummies	seasonal dummies
I001..... I9904	Impuls_Dummies (Impuls jeweils im entsprechendem Jahr/Quartal)	
S9101...S9701	Sprung-Dummies (Sprung jeweils im entsprechendem Jahr/Quartal)	

Residuen: Residuals:

FR_RES_.....

B. Augmented Dickey-Fuller unit root Tests

Sample 1980:1 – 2003:4	**Niveau**			**First Differences**			
Variables	**Specification**	**Lags**	**Teststatistik**	**Specification**	**Lags**	**Teststatistik**	**Order of Integration**
DE_SPREAD	C	1	-3,31**	-	-	-	I(0)
LOG(EU8OFR_GDP95)	C, trend, z1 z2 z3	1-4	-1,97	C, z1 z2 z3	1-3	-3,27**	I(1)
LOG(EU8OFR_IFC95)	C, trend, z1 z2 z3	1-4	-2,39	C, z1 z2 z3	1-3	-2,94	I(1)
LOG(EU8OFR_X95)	C, trend, z1 z2 z3	1	-3,36	C, z1 z2 z3	-	-9,98*	I(1)
LOG(FR_C95)	C, trend, z1 z2 z3	1-4	-2,09	C, z1 z2 z3	1-3	-3,93*	I(1)
LOG(FR_CFC)	C, trend	1-6	-2,73	C	1-5	-3,18*	I(1)
LOG(FR_CGOV95)	C, trend, z1 z2 z3	1-4	-2,90	C, z1 z2 z3	1-3	-3,59*	I(1)
LOG(FR_EE)	C, trend, z1 z2 z3	1-8	-2,62	C, z1 z2 z3	1,2,3,7	-3,26**	I(1)
LOG(FR_END95)	C, trend, z1 z2 z3	1-4	-2,61	C, z1 z2 z3	1	-5,05*	I(1)
LOG(FR_ES)	C, trend	1-5	-3,00	C	1,2,4,6	-1,98	I(2)
LOG(FR_ET)	C, trend, z1 z2 z3	1-8	-2,21	z1 z2 z3	1-7	-2,20**	I(1)
LOG(FR_GDP)	C, trend, z1 z2 z3	1,3,4	-5,02*	-	-	-	Trendstationary
LOG(FR_GDP95)	C, trend, z1 z2 z3	1-4	-2,48	C, z1 z2 z3	1	-5,38*	I(1)

* Significant at 1% rejection level of the Dickey-Fuller Tests statistics
** Significant at 5% rejection level of the Dickey-Fuller Tests statistics
*** Significant at 10% rejection level of the Dickey-Fuller Tests statistics
**** Rejects the hypothesis of $\gamma = 0$ under normal distribution. See Enders (1995), p. 257

Sample 1980:1 – 2003:4	Niveau			First Differences			
Variables	**Specification**	**Lags**	**Teststatistik**	**Specification**	**Lags**	**Teststatistik**	**Order of Integration**
LOG(FR_GWAGE)	C, trend	1	-3,92**	-	-	-	Trendstationary
LOG(FR_GWAGEE)	C, trend	1-8	-1,73	C	1-7	-5,57*	I(1)
LOG(FR_GWAGE95)	C, trend, z1 z2 z3	1-8	-3,33	C, z1 z2 z3	1-7	-1,90**	I(1)
LOG(FR_GYPROP)	C, trend, z1 z2 z3	1-7	-0,85	C, z1 z2 z3	1-4	-3,30**	I(1)
LOG(FR_ICON95)	C, trend, z1 z2 z3	1-4	-2,84	C, z1 z2 z3	1-3	-2,63***	I(1)****
LOG(FR_IEND95)	C, trend, z1 z2 z3	1-4	-2,65	C z1 z2 z3	1	-5,03*	I(1)
LOG(FR_IFC95)	C, trend, z1 z2 z3	1-4	-3,42	z1 z2 z3	1-3	--2,03**	I(1)
LOG(FR_IMEQ95)	C, trend z1 z2 z3	1-4	-3,25	C, z1 z2 z3	4,5	-8,61*	I(1)
FR_IS95	C	1-7	-2,38	-	1-6	-5,94*-	I(1)
LOG(FR_M95)	C, trend, z1 z2 z3	1-5	-2,44	C, z1 z2 z3	1-4	-4,39*	I(1)
LOG(FR_NAW_US)	C, trend, z1 z2 z3	1	-2,98	C, z1 z2 z3	-	-6,56*	I(1)

* Significant at 1% rejection level of the Dickey-Fuller Tests statistics
** Significant at 5% rejection level of the Dickey-Fuller Tests statistics
*** Significant at 10% rejection level of the Dickey-Fuller Tests statistics
**** Rejects hypothesis of the unit root only at 10% rejection level due to the change in seasonal pattern in 1998

Sample 1980:1 – 2003:4	Niveau			First Differences			
Variables	**Specification**	**Lags**	**Teststatistik**	**Specification**	**Lags**	**Teststatistik**	**Order of Integration**
LOG(FR_PC)	C, trend, z1 z2 z3	1-8	-1,94	C, z1 z2 z3	1-7	-4,67*	I(1)
LOG(FR_PGI)	C, trend	1-8	-4,33*	-	-	-	Trendstationry
LOG(FR_PGDP)	C, trend	1-8	-2,86	C	1-7	-4,76*	I(1)
LOG(FR_PGESDEF)	C, trend	1-8	-2,84	C	1-7	-3,79*	I(1)
LOG(FR_PM)	C, trend z1, z2, z3	1, 2, 4, 5	-3,48	C, z1, z2, z3	1-4	-4,48*	I(1)
LOG(FR_PRODEE)	C, trend, z1 z2 z3	1	-0,73	C, z1 z2 z3	-	-15,26*	I(1)
LOG(FR_PX)	C, trend, z1, z2, z3	1-5	-3,57	C, z1, z2, z3	1, 2, 4, 5	-3,86*	I(1)
LOG(FR_REEV_CPI)	C, trend, z1 z2 z3	1	-2,64	z1 z2 z3	-	-7,22*	I(1)
LOG(FR_REEV_EWU)	C, trend	1-3	-4,03	-	-	-	Trendstationary
LOG(FR_RELP)	C, trend, z1 z2 z3	1-7	-0,83	C, z1 z2 z3	1-6	-4,08*	I(1)
FR_RL5Y	C	1	-1,21	C	-	-5,85*	I(1)

* Significant at 1% rejection level of the Dickey-Fuller Tests statistics
** Significant at 5% rejection level of the Dickey-Fuller Tests statistics
*** Significant at 10% rejection level of the Dickey-Fuller Tests statistics
**** Rejects the hypothesis of $\gamma = 0$ under normal distribution. See Enders (1995), p. 257

Sample 1980:1 – 2003:4	Niveau			First Differences			
Variables	**Specification**	**Lags**	**Teststatistik**	**Specification**	**Lags**	**Teststatistik**	**Order of Integration**
FR_RRL5Y	C	-	-2,91	-	-	-8,68	I(1)
FR_RS3M	C	1-5	-1,68	C	1-4	-5,81	I(1)
LOG(FR_S)	C, z1 z2 z3	1,4,5	-3.96**	-	-	-	I(0)
FR_SPREAD	C	-	-3,11*	-	-	-	I(0)
LOG(FR_TIND)	C, trend, z1 z2 z3 s9801*z1 s9801*z2 s9801*z3	1,2,4,5	-3.26	C, trend, z1 z2 z3 s9801*z1 s9801*z2 s9801*z3	2,3	-23,22	I(1)
LOG(FR_TIND95)	C, trend, z1 z2 z3	1-4	-2,62	C, z1 z2 z3	1-5	-3,57*	I(1)
LOG(FR_U)	C, trend	1	-2,72	C	-	-3,38**	I(1)
LOG(FR_ULC)	C, trend, z1 z2 z3	1-5	-3,44**	-	-	-	Trendstationary
FR_UR	C, trend	1	-2,80	z1	8	-2.93	I(1)
LOG((FR_W)	C, trend z1 z2 z3	1,4,5,6,7,8	-4.68*	-	-	-	Trendstationary
LOG(FR_X95)	C, z1 z2 z3	5,7	0.51	C z1 z2 z3	4,7	-9.34	I(1)

* Significant at 1% rejection level of the Dickey-Fuller Tests statistics
** Significant at 5% rejection level of the Dickey-Fuller Tests statistics
*** Significant at 10% rejection level of the Dickey-Fuller Tests statistics
**** Rejects the hypothesis of $\gamma = 0$ under normal distribution. See Enders (1995), p. 257

Sample 1980:1 – 2003:4	Niveau			First Differences			
Variables	**Specification**	**Lags**	**Teststatistik**	**Specification**	**Lags**	**Teststatistik**	**Order of Integration**
LOG(FR_XG95)	C, z1 z2 z3	5,7	0.54	C, z1 z2 z3	4	-11.63**	I(1)
LOG(FR_XG95_EWU)	C, z1 z2 z3	-	-1.51	C, z1 z2 z3	-	-8.52**	I(1)
LOG(FR_XG95_ROW)	C, trend, z1 z2 z3	1,5	-3.14	C, z1 z2 z3	5	-11.64**	I(1)
LOG(FR_XS95)	C, trend, z1 z2 z3	1,8	-3.85**	C, z1 z2 z3	1,2,3,8	-4.87*	I(1)
LOG(FR_Y)	C, trend, z1 z2 z3	1,3,4,6,8	-3.06	C, z1 z2 z3	3,6,7	-18.25*	I(1)
LOG(FR_Y95)	z1 z2 z3	1,4,5,8	1.65	C, z1 z2 z3	3,6,7	-17.11*	I(1)
Oil$	z1 z2 z3	5,8	-0.50	C, z1 z2 z3	1,3	-8.28*	I(1)
LOG(ROW_GDP95)	C, z1 z2 z3	2	0.97	C, z1 z2 z3	-	-8.98*	I(1)
LOG(Fr_N95)	z1 z2 z3	2,4	2.12	C, z1 z2 z3	1,4	-4.78*	I(1)
LOG(FR_TSSEM)	C, trend, z1 z2 z3	1-7	-5,53	-	-	-	Trendstationary

* Significant at 1% rejection level of the Dickey-Fuller Tests statistics
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**** Rejects the hypothesis of $\gamma = 0$ under normal distribution. See Enders (1995), p. 257