

0.1 Supply-Use equilibrium

This section provides the equations defining the supply use - equilibrium for the domestic and imported products and at the aggregate level. It also derives the GDP according to various definitions. Since each relation is written in value and in volume, the value equation defines the price.

0.1.1 Use side

Market price for the domestically produced commodity c

$$PQD_c QD_c = PMGRD_c MGRD_c + PCID_c CID_c + PCHD_c CHD_c + PGD_c GD_c + PID_c ID_c + PXD_c XD_c + PDSD_c DSD_c \quad (0.1)$$

Quantity of domestically produced commodity c expressed at market price

$$QD_c = MGRD_c + CID_c + CHD_c + GD_c + ID_c + XD_c + DSD_c \quad (0.2)$$

Market price for imported commodity c

$$PQM_c QM_c = PMGRM_c MGRM_c + PCIM_c CIM_c + PCHM_c CHM_c + PGM_c GM_c + PIM_c IM_c + PXM_c XM_c + PDSM_c DSM_c \quad (0.3)$$

Quantity of imported commodity c expressed at market price

$$QM_c = MGRM_c + CIM_c + CHM_c + GM_c + IM_c + XM_c + DSM_c \quad (0.4)$$

Market price for the domestically produced commodity c for intermediary consumption use

$$PCID_c CID_c = \sum_s PCID_{c,s} CID_{c,s} \quad (0.5)$$

Quantity of domestically produced commodity c for intermediary consumption use expressed at market price

$$CID_c = \sum_s CID_{c,s} \quad (0.6)$$

Market price for imported commodity c for intermediary consumption use

$$PCIM_c CIM_c = \sum_s PCIM_{c,s} CIM_{c,s} \quad (0.7)$$

Quantity of imported commodity c for intermediary consumption use expressed at market price

$$CIM_c = \sum_s CIM_{c,s} \quad (0.8)$$

Market price for domestically produced commodity c for investment use

$$PID_c ID_c = \sum_s PID_{c,s} ID_{c,s} \quad (0.9)$$

Quantity of imported commodity c for investment use expressed at market price

$$ID_c = \sum_s ID_{c,s} \quad (0.10)$$

Market price for imported commodity c for investment use

$$PIM_c IM_c = \sum_s PIM_{c,s} IM_{c,s} \quad (0.11)$$

Quantity of imported commodity c for investment use expressed at market price

$$IM_c = \sum_s IM_{c,s} \quad (0.12)$$

Market price of commodity c

$$PQ_c Q_c = PQD_c QD_c + PQM_c QM_c \quad (0.13)$$

Quantity of commodity c expressed at market price

$$Q_c = QD_c + QM_c \quad (0.14)$$

Market price of commodity c for intermediate consumption use

$$PCI_c CI_c = PCID_c CID_c + PCIM_c CIM_c \quad (0.15)$$

Quantity of commodity c expressed at market price for intermediate consumption use

$$CI_c = CID_c + CIM_c \quad (0.16)$$

Market price of commodity c for investment use

$$PI_c I_c = PID_c ID_c + PIM_c IM_c \quad (0.17)$$

Quantity of commodity c expressed at market price for investment use

$$I_c = ID_c + IM_c \quad (0.18)$$

Market price of commodity c for change in inventories use

$$PDS_c DS_c = PDSD_c DSD_c + PDSM_c DSM_c \quad (0.19)$$

Quantity of commodity c expressed at market price for change in inventories use

$$DS_c = DSD_c + DSM_c \quad (0.20)$$

Aggregate market price for domestically produced commodities

$$PQD.QD = \sum_c PQD_c QD_c \quad (0.21)$$

Total quantity of domestically produced commodities

$$QD = \sum_c QD_c \quad (0.22)$$

Aggregate market price for imported commodities

$$PQM.QM = \sum_c PQM_c QM_c \quad (0.23)$$

Total quantity of imported commodities

$$QM = \sum_c QM_c \quad (0.24)$$

Aggregate market price for margins received on domestically produced commodities

$$PMGRD.MGRD = \sum_c PMGRD_c MGRD_c \quad (0.25)$$

Total quantity of margins received on domestically produced commodities

$$MGRD = \sum_c MGRD_c \quad (0.26)$$

Aggregate market price for margins received on imported commodities

$$PMGRM.MGRM = \sum_c PMGRM_c MGRM_c \quad (0.27)$$

Total quantity of margins received on imported commodities

$$MGRM = \sum_c MGRM_c \quad (0.28)$$

Aggregate market price on domestically produced commodities for intermediate consumption use

$$PCID.CID = \sum_c PCID_c CID_c \quad (0.29)$$

Total quantity of domestically produced commodities for intermediate consumption use

$$CID = \sum_c CID_c \quad (0.30)$$

Aggregate market price on imported commodities for intermediate consumption use

$$PCIM.CIM = \sum_c PCIM_c CIM_c \quad (0.31)$$

Total quantity of imported commodities for intermediate consumption use

$$CIM = \sum_c CIM_c \quad (0.32)$$

Aggregate market price on domestically produced commodities for households final consumption expenditure

$$PCHD.CHD = \sum_c PCHD_c CHD_c \quad (0.33)$$

Total quantity of domestically produced commodities for household final consumption expenditure

$$CHD = \sum_c CHD_c \quad (0.34)$$

Aggregate market price on imported commodities for households final consumption expenditure

$$PCHM.CHM = \sum_c PCHM_c CHM_c \quad (0.35)$$

Total quantity of imported commodities for households final consumption expenditure

$$CHM = \sum_c CHM_c \quad (0.36)$$

Aggregate market price on domestically produced commodities for government final consumption expenditure

$$PGD.GD = \sum_c PGD_c GD_c \quad (0.37)$$

Total quantity of domestically produced commodities for government final consumption expenditure

$$GD = \sum_c GD_c \quad (0.38)$$

Aggregate market price on imported commodities for government final consumption expenditure

$$PGM.GM = \sum_c PGM_c GM_c \quad (0.39)$$

Total quantity of imported commodities for government final consumption expenditure

$$GM = \sum_c GM_c \quad (0.40)$$

Aggregate market price on domestically produced commodities for investment use

$$PID.ID = \sum_c PID_c ID_c \quad (0.41)$$

Total quantity of domestically produced commodities for investment use

$$ID = \sum_c ID_c \quad (0.42)$$

Aggregate market price on imported produced commodities for investment use

$$PIM.IM = \sum_c PIM_c IM_c \quad (0.43)$$

Total quantity of imported commodities for investment use

$$IM = \sum_c IM_c \quad (0.44)$$

Aggregate market price on domestically produced commodities for exports use

$$PXD.XD = \sum_c PXD_c XD_c \quad (0.45)$$

Total quantity of domestically produced commodities for exports use

$$XD = \sum_c XD_c \quad (0.46)$$

Aggregate market price on imported commodities for exports use

$$PXM.XM = \sum_c PXM_c XM_c \quad (0.47)$$

Total quantity of imported commodities for exports use

$$XM = \sum_c XM_c \quad (0.48)$$

Aggregate market price on domestically produced commodities for change in inventories use

$$PDSD.DSD = \sum_c PDSD_c DSD_c \quad (0.49)$$

Total quantity of domestically produced commodities for change in inventories use

$$DSD = \sum_c DSD_c \quad (0.50)$$

Aggregate market price on imported commodities for change in inventories use

$$PDSM.DSM = \sum_c PDSM_c DSM_c \quad (0.51)$$

Total quantity of imported commodities for change in inventories use

$$DSM = \sum_c DSM_c \quad (0.52)$$

Aggregate market price of commodities

$$PQ.Q = PQD.QD + PQM.QM \quad (0.53)$$

Total quantity of commodities

$$Q = QD + QM \quad (0.54)$$

Aggregate market price of margins on commodities

$$PMGR.MGR = PMGRD.MGRD + PMGRM.MGRM \quad (0.55)$$

Total quantity of margins on commodities

$$MGR = MGRD + MGRM \quad (0.56)$$

Aggregate market price of commodities for intermediate consumption use

$$PCI.CI = PCID.CID + PCIM.CIM \quad (0.57)$$

Total quantity of commodities for intermediate consumption use

$$CI = CID + CIM \quad (0.58)$$

Aggregate market price of commodities for household final consumption expenditure

$$PCH.CH = PCHD.CHD + PCHM.CHM \quad (0.59)$$

Total quantity of commodities for household final consumption expenditure

$$CH = CHD + CHM \quad (0.60)$$

Aggregate market price of commodities for government final consumption expenditure

$$PG.G = PGD.GD + PGM.GM \quad (0.61)$$

Total quantity of commodities for government final consumption expenditure

$$G = GD + GM \quad (0.62)$$

Aggregate market price of commodities for investment use

$$PI.I = PID.ID + PIM.IM \quad (0.63)$$

Total quantity of commodities for investment use

$$I = ID + IM \quad (0.64)$$

Aggregate market price of commodities for exports use

$$PX.X = PXD.XD + PXM.XM \quad (0.65)$$

Total quantity of commodities for exports use

$$X = XD + XM \quad (0.66)$$

Aggregate market price of commodities for change in inventories use

$$PDS.DS = PDSD.DSD + PDSM.DSM \quad (0.67)$$

Total quantity of commodities for change in inventories use

$$DS = DSD + DSM \quad (0.68)$$

price for margins paid on domestically produced commodity c

$$PMGPD_c MGPD_c = \sum_{cc} PMGPD_{cc,c} MGPD_{cc,c} \quad (0.69)$$

Quantity of margins paid on domestically produced commodity c

$$MGPD_c = \sum_{cc} MGPD_{cc,c} \quad (0.70)$$

price for margins paid on imported commodity c

$$PMGPM_c MGPM_c = \sum_{cc} PMGPM_{cc,c} MGPM_{cc,c} \quad (0.71)$$

Quantity of margins paid on imported commodity c

$$MGPM_c = \sum_{cc} MGPM_{cc,c} \quad (0.72)$$

Quantity of production of commodity c expressed at domestic production price

The price can not be defined as an index because it is already defined as a function of the production price in the price block.

$$YQ_c PYQ_c + NTAXPD_c^{VAL} + PMGPD_c MGPD_c = PQD_c QD_c \quad (0.73)$$

Same variable calculated from values & volumes. For verification. (NO COMMENT ?)

$$PYQ_c^{bis} YQ_c + NTAXPD_c^{VAL} + PMGPD_c MGPD_c = PQD_c QD_c \quad (0.74)$$

$$YQ_c^{bis} + NTAXPD_c + MGPD_c = QD_c \quad (0.75)$$

Quantity of imports of commodity c expressed at imports price

$$M_c PM_c + NTAXPM_c^{VAL} + PMGPM_c MGPM_c = PQM_c QM_c \quad (0.76)$$

Same variable calculated from volumes. For verification. (NO COMMENT?)

$$PM_c^{bis} M_c + NTAXPM_c^{VAL} + PMGPM_c MGPM_c = PQM_c QM_c \quad (0.77)$$

$$M_c^{bis} + NTAXPM_c + MGPM_c = QM_c \quad (0.78)$$

Price of margins paid to commodity cc on commodity c

$$PMGP_{cc,c} MGP_{cc,c} = PMGPD_{cc,c} MGPD_{cc,c} + MGPM_{cc,c} MGPM_{cc,c} \quad (0.79)$$

Margins paid to commodity cc on commodity c expressed at margin paid price

$$MGP_{cc,c} = MGPD_{cc,c} + MGPM_{cc,c} \quad (0.80)$$

Price of margins received by commodity cc

$$PMGR_{cc} MGR_{cc} = \sum_c PMGP_{cc,c} MGP_{cc,c} \quad (0.81)$$

Margins received by commodity cc expressed at margin received price

$$MGR_{cc} = \sum_c MGP_{cc,c} \quad (0.82)$$

Same variable calculated from values & volumes. For verification. (NO COMMENT ?)

$$PMGR_c^{bis} MGR_c^{bis} = PMGRD_c MGRD_c + PMGRM_c MGRM_c \quad (0.83)$$

$$MGR_c^{bis} = MGRD_c + MGRM_c \quad (0.84)$$

Remark about margins:

The margins paid $MGPD_{cc,c}$ and $MGPM_{cc,c}$ are defined with behavioral equations. They follow YQ_c and M_c (more or less proportionnally depending on the possibility of substitutions between margins). See producer block. The margins paid are then aggregated to define the margins recieved MGR_{cc} . The latter is then disagrated between the domestic and imported margins recieved ($MGRD_c$ and $MGRM_c$). See producer block.

Aggregate price of margins paid on domestically produced commodity c

$$PMGPD.MGPD = \sum_c PMGPD_c MGPD_c \quad (0.85)$$

Quantity of margins paid on domestically produced commodities

$$MGPD = \sum_c MGPD_c \quad (0.86)$$

Aggregate price of margins paid on imported commodities

$$PMGPM.MGPM = \sum_c PMGPM_c MGPM_c \quad (0.87)$$

Quantity of margins paid on imported commodities

$$MGPM = \sum_c MGPM_c \quad (0.88)$$

Aggregate basic price of domestically produced commodities

$$PYQ.YQ = \sum_c PYQ_c YQ_c \quad (0.89)$$

Total domestic production expressed at basic price

$$YQ = \sum_c YQ_c \quad (0.90)$$

Aggregate basic price of imported commodities

$$PM.M = \sum_c PM_c M_c \quad (0.91)$$

Total imported commodities expressed at basic price

$$M = \sum_c M_c \quad (0.92)$$

Aggregate basic price of domestically produced commodities for intermediate consumption use by the sector s

$$PCID_s CID_s = \sum_c PCID_{c,s} CID_{c,s} \quad (0.93)$$

Quantity of domestically produced commodities for intermediate consumption use by the sector s expressed at basic price

$$CID_s = \sum_c CID_{c,s} \quad (0.94)$$

Aggregate basic price of imported commodities for intermediate consumption use by the sector s

$$PCIM_s CIM_s = \sum_c PCIM_{c,s} CIM_{c,s} \quad (0.95)$$

Quantity of imported commodities for intermediate consumption use by the sector s expressed at basic price

$$CIM_s = \sum_c CIM_{c,s} \quad (0.96)$$

Aggregate basic price of commodities for intermediate consumption use by the sector s

$$PCI_s CI_s = PCID_s CID_s + PCIM_s CIM_s \quad (0.97)$$

Quantity of commodities for intermediate consumption use by the sector s expressed at basic price

$$CI_s = CID_s + CIM_s \quad (0.98)$$

Intermediary raw material from sector aggregation (value & volume) : NO COMMENT

$$PCI^{bis}.CI^{bis} = \sum_s PCI_s CI_s \quad (0.99)$$

$$CI^{bis} = \sum_s CI_s \quad (0.100)$$

Aggregate investment price of domestically produced commodities for investment use by the sector s

$$PID_s ID_s = \sum_c PID_{c,s} ID_{c,s} \quad (0.101)$$

Quantity of domestically produced commodities for investment use by the sector s expressed at investment price of domestically produced commodities

$$ID_s = \sum_c ID_{c,s} \quad (0.102)$$

Aggregate investment price of imported commodities for investment use by the sector s

$$PIM_s IM_s = \sum_c PIM_{c,s} IM_{c,s} \quad (0.103)$$

Quantity of imported commodities for investment use by the sector s expressed at investment price of imported commodities

$$IM_s = \sum_c IM_{c,s} \quad (0.104)$$

Aggregate investment price of commodities for investment use by the sector s

$$PI_s I_s = PID_s ID_s + PIM_s IM_s \quad (0.105)$$

Total quantity of commodities for investment use by the sector s expressed at investment price

$$I_s = ID_s + IM_s \quad (0.106)$$

Investment from sector agregation (value & volume) (summed directly on the aggregate per product c). For verification: (NO COMMENT ?)

$$PI^{bis}.I^{bis} = \sum_s PI_s I_s \quad (0.107)$$

$$I^{bis} = \sum_s I_s \quad (0.108)$$

Quantity of commodities produced from the sector s expressed at the production price

$$Y_s = \sum_c Y_{c,s} \quad (0.109)$$

Aggregate production price for all sectors

$$PY.Y = \sum_s PY_s Y_s \quad (0.110)$$

Total quantity of production expressed at production price

$$Y = \sum_s Y_s \quad (0.111)$$

Added-value of sector s expressed in value

$$VA_s^{VAL} = PY_s Y_s - PCI_s CI_s \quad (0.112)$$

Added-value of sector s expressed in volume

$$VA_s = Y_s - CI_s \quad (0.113)$$

Aggregate value-added price

$$PVA.VA = \sum_s VA_s^{VAL} \quad (0.114)$$

Total value-added expressed at value-added price

$$VA = \sum_s VA_s \quad (0.115)$$

Aggregate gross wages paid by sector s including employees (but not employers)' social contribution

$$PWAGES.WAGES = \sum_s PWAGES_s WAGES_s \quad (0.116)$$

$$WAGES = \sum_s WAGES_s \quad (0.117)$$

Gross operating surplus of sector s expressed in value

$$\begin{aligned} GOS_s^{VAL} \\ = VA_s^{VAL} - PWAGES_s WAGES_s - PRSSC_s RSSC_s - NTAXI_s^{VAL} \end{aligned} \quad (0.118)$$

Gross operating surplus of sector s expressed in volume

$$GOS_s = VA_s - WAGES_s - RSSC_s - NTAXI_s \quad (0.119)$$

Aggregate price of Gross Operating Surplus

The exact definition of the GOS generally exclude tax on profit. We do not do it here for simplicity and assume that $NTAXI_s$ includes all net taxes on capital (i.e. tax on production and profits). This should be taken into account if one wants to use the GOS as a basis for the profit taxes.

$$PGOS.GOS = \sum_s GOS_s^{VAL} \quad (0.120)$$

Total Gross Operating Surplus

$$GOS = \sum_s GOS_s \quad (0.121)$$

Net operating surplus of sector s expressed in value

$$NOS_s^{VAL} = GOS_s^{VAL} - PK_{s,t-1} \delta_s F_{K,s,t-1} \quad (0.122)$$

Net operating surplus of sector s expressed in volume

$$NOS_s = GOS_s - PK_{s,t-1} \delta_s F_{K,s,t-1} \quad (0.123)$$

Aggregate net operating surplus price

$$PNOS.NOS = \sum_s NOS_s^{VAL} \quad (0.124)$$

Total Net Operating Surplus

$$NOS = \sum_s NOS_s \quad (0.125)$$

0.1.2 GDP calculated according to various approaches

Total GDP price from expenditure approach

Calculated as the sum of the different components in the final uses of goods & services

$$PGDP.GDP = PCH.CH + PG.G + PI.I + PX.X + PDS.DS - PM.M \quad (0.126)$$

Total GDP from expenditure approach

$$GDP = CH + G + I + X + DS - M \quad (0.127)$$

GDP price of commodity c from expenditure approach

$$\begin{aligned} PGDP_c GDP_c = & PCH_c CH_c + PG_c G_c + PI_c I_c \\ & + PX_c X_c + PDS_c DS_c - PM_c M_c \end{aligned} \quad (0.128)$$

GDP of commodity c from expenditure approach

$$GDP_c = CH_c + G_c + I_c + X_c + DS_c - M_c \quad (0.129)$$

Agregated GDP (value & volume) calculated from the GDP per using commodity (NO COMMENT ?)

$$PGDP^{bis}.GDP^{bis} = \sum_c PGDP_c GDP_c \quad (0.130)$$

$$GDP^{bis} = \sum_c GDP_c \quad (0.131)$$

Total GDP from production approach

Calculated as the sum of the gross value added plus the total net taxes

$$PGDP^{ter}.GDP^{ter} = PVA.VA + PNTAXP.NTAXP \quad (0.132)$$

GDP price from production approach

$$GDP^{ter} = VA + NTAXP \quad (0.133)$$

Total GDP from income approach

Calculated as the sum of all the economic incomes (from labor and capital) corrected by the social & taxes transfers

$$\begin{aligned} PGDP4.GDP4 = & PGOS.GOS + PWAGES.WAGES + PRSSC.RSSC \\ & + NTAXI^{VAL} + PNTAXP.NTAXP \end{aligned} \quad (0.134)$$

GDP price from income approach

$$GDP4 = GOS + WAGES + RSSC + NTAXI + NTAXP \quad (0.135)$$

0.2 Producer

This file provides the equations defining the producer behaviour. Equation are behavioral. They are not used to calibrate the initial value of variables. They may be inverted to calibrate a parameter.

0.2.1 Margins

Margins paid to commodity cc on the domestic commodity c

The growth in demand for margins follows the growth of aggregate demand for the commodity c and a substitution term

$$\Delta(\log MGPLD_{cc,c}) = \Delta(\log YQ_c) + \Delta(SUBST_{cc,c}^{MGPD}) \quad (0.136)$$

Notional substitution between margin-making sectors m for the domestically produced commodity c

$$SUBST_{m,c}^{m,MGPD} = \sum_{mm} -\sigma_{m,mm,c}^{MGPD} \varphi_{mm,c,t-1}^{MGPD} \Delta(\log PMGPLD_{m,c} - \log PMGPLD_{mm,c}) \quad (0.137)$$

market share of the margin-making sector m for the commodity c

$$\varphi_{m,c}^{MGPD} = PMGPLD_{m,c} \frac{MGPD_{m,c}}{(\sum_{mm} PMGPLD_{mm,c} MGPD_{mm,c})} \quad (0.138)$$

Margins paid to commodity m on the imported commodity c

$$\Delta(\log MGPM_{m,c}) = \Delta(\log M_c) + \Delta(SUBST_{m,c}^{MGPM}) \quad (0.139)$$

Notional substitution effect between the margin-making sector m and the over margin-makings sectors mm for the imported commodity c

$$SUBST_{m,c}^{n,MGPM} = \sum_{mm} -\sigma_{m,mm,c}^{MGPM} \varphi_{mm,c,t-1}^{MGPM} \Delta(\log PMGPM_{m,c} - \log PMGPM_{mm,c}) \quad (0.140)$$

share of the margin type m on total margins paid on the domestic commodity c

$$\varphi_{m,c}^{MGPM} = PMGPM_{m,c} \frac{MGPM_{m,c}}{(\sum_{mm} PMGPM_{mm,c} MGPM_{mm,c})} \quad (0.141)$$

0.2.2 Production factors

Production of commodity c by sector s

We assume that each activity s may produce more than one commodity c . Therefore the production Y of commodity c by the activity s depends on the parameter $\varphi_{c,s}^Y$ which represents the share of sector s in the total production of commodity c .

$$Y_{c,s} = \text{Phi} Y_{c,s} Y Q_c \quad (0.142)$$

Demand for production factor f of sector s

$$\Delta (\log F_{f,s}^n) = \Delta (\log Y_s) - \Delta (\log \text{PROG}_{f,s}) + \Delta (\text{SUBST}_{f,s}^F) \quad (0.143)$$

Notional substitution effect between the input f and the over inputs ff

$$\Delta (\text{SUBST}_{f,s}^{n,F}) = \sum_{ff} -ES_{f,ff,s} \varphi_{ff,s,t-1} \Delta \left(\log \frac{C_{f,s}}{\text{PROG}_{f,s}} - \log \frac{C_{ff,s}}{\text{PROG}_{ff,s}} \right) \quad (0.144)$$

Share of production factor f of sector s

$$\varphi_{f,s} = \frac{C_{f,s} F_{f,s}^n}{\sum_{ff} C_{ff,s} F_{ff,s}^n} \quad (0.145)$$

Aggregate capital input

$$F_K = \sum_s F_{K,s} \quad (0.146)$$

Aggregate labor input

$$F_L = \sum_s F_{L,s} \quad (0.147)$$

Aggregate energy input

$$F_E = \sum_s F_{E,s} \quad (0.148)$$

Aggregate materials input

$$F_{MAT} = \sum_s F_{MAT,s} \quad (0.149)$$

Investment use of commodity c by sector s

For a given sector, we assume that the investment structure is fixed over time. In other words, the investment good is a composite of several commodities in fixed proportion.

$$\Delta(\log I_{c,s}) = \Delta(\log IA_s) \quad (0.150)$$

Energy input demand by type of energy ce by sector s

$$\Delta(\log CI_{ce,s}) = \Delta(\log F_{E,s}) + \Delta(SUBST_{ce,s}^{CI}) \quad (0.151)$$

Notional substitution effect between the energy commodity ce and the over energy commodities cee for the sector s

$$\Delta(SUBST_{ce,s}^{n,CI}) = \sum_{cee} -\sigma_{ce,cee,s}^{NRJ} \varphi_{E,cee,s,t-1} \Delta(\log PCI_{ce,s} - \log PCI_{cee,s}) \quad (0.152)$$

Share of energy input ce on total energy use by sector s

$$\varphi_{E,ce,s} = \frac{PCI_{ce,s} CI_{ce,s}}{\sum_{cee} PCI_{cee,s} CI_{cee,s}} \quad (0.153)$$

Demand for material commodity cmo by sector s

Intermediary consumption that are not transport or energy commodities are not substitutables (Leontief technology)

$$\Delta(\log CI_{cmo,s}) = \Delta(\log F_{MAT,s}) \quad (0.154)$$

Demand for transport commodities by sector s

We assume no substitution for Transport with the other inputs

$$\Delta(\log TRSP_s) = \Delta(\log F_{MAT,s}) \quad (0.155)$$

Demand for transport commodity ct by sector s

$$\Delta(\log CI_{ct,s}) = \Delta(\log TRSP_s) + \Delta(SUBST_{ct,s}^{CI}) \quad (0.156)$$

Notional substitution effect between the transport ct and the over transports ctt for the sector s

$$\Delta(SUBST_{ct,s}^{n,CI}) = \sum_{ctt} -\sigma_{ct,ctt,s}^{TRSP} \varphi_{ctt,s,t-1}^{TRSP} \Delta(\log PCI_{ct,s} - \log PCI_{ctt,s}) \quad (0.157)$$

Share for transport ct use in total transport by sector s

$$\varphi_{ct,s}^{TRSP} = \frac{PCI_{ct,s} CI_{ct,s}}{\sum_{ctt} PCI_{ctt,s} CI_{ctt,s}} \quad (0.158)$$

Technical progress of the production factor f in the sector s

$$PROG_{f,s} = PROG_{f,s,t-1} (1 + GR_{f,s}^{PROG}) \quad (0.159)$$

Endogenous energy efficiency

This specification states that the productivity gain of energy input in the sector s for the energy type ce depends on a steady-state trend (exogenous) and a price-induced component. This component is equal to a $A RHO^P ROG_E PE$ share of the log-difference between the level of the general energy price index for the sector s to the general level of prices

$$GR_{E,s}^{PROG} = GR_{E,s,t_0}^{PROG} + \rho^{PROG,E,PE} \cdot (\log PE_s - \log P) \quad (0.160)$$

$> 0) \Delta(\log PE_s - \log P)$

0.3 Prices

0.3.1 This file provides the equations defining the prices.

Domestic production price of commodity c

$$PYQ_c YQ_c = \sum_s PY_s Y_{c,s} \quad (0.161)$$

Notional production price of sector s

$$PY_s^n = CU_s^n (1 + \mu_s) \quad (0.162)$$

Notional mark-up of the sector s

$$\Delta(\log 1 + \mu_s^n) = \rho^{\mu, Y} \cdot \Delta(\log CUR_s) \quad (0.163)$$

Notional mark-up of the sector s (definition 2)

$$\Delta(\log 1 + \mu_s^{n2}) = \rho^{\mu, Y} \cdot (\Delta(\log Y_s) - \Delta(\log Y_{s,t-1})) \quad (0.164)$$

Production capacity of the sector s

$$\begin{aligned} \Delta(\log YCAP_s) = & \sum_f \varphi_{f,s,t-1} \Delta(\log F_{f,s} PROG_{f,s}) \\ & + \alpha_s^{YCAP, Y} (\log Y_{s,t-1} - \log YCAP_{s,t-1} CUR_{s,t0}) \end{aligned} \quad (0.165)$$

Capacity Utilisation ratio of the sector s

$$CUR_s = \frac{Y_s}{YCAP_s} \quad (0.166)$$

Average mark-up on commodity c

$$(1 + \mu_c) = PYQ_c \frac{YQ_c}{(\sum_s CU_s Y_{c,s})} \quad (0.167)$$

Notional unit cost of production in sector s

To define the notional price, it is preferable to use the notional unit cost of production instead of the effective one. This lead to a more stable dynamic and gives a better representation of anticipation.

$$CU_s^n Y_s = \sum_f C_{f,s} F_{f,s}^n + NTAXI_s^{VAL} \quad (0.168)$$

Unit cost of production in sector s

$$CU_s Y_s = \sum_f C_{f,s} F_{f,s} + NTAX I_s^{VAL} \quad (0.169)$$

Labor cost in sector s

$$C_{L,s} = W_s (1 + RRSSC_s) \quad (0.170)$$

Capital cost in sector s

It is preferable to calculate the user cost of capital based on the price of capital rather than on the price of investment. Indeed the price of the average capital installed is lower than the one of investment because of inflation. Using the price of investment tend to over estimate the cost of capital because it assumes that the debt contracted to finance past investments is indexed on inflation which is not the case in reality.

$$C_{K,s} = PK_s (\delta_s + r_s) \quad (0.171)$$

Price of capital in sector s

The price of capital is calibrated by rewriting this equation in the long run.

It is always smaller than 1 because it is calibrated as follows: $PK[s] = PI[s] * (Rdep[s] + GR\text{'}REAL) * (1 + GR\text{'}PRICES) / (Rdep[s] - 1 + (1 + GR\text{'}REAL) * (1 + GR\text{'}PRICES))$

$$PK_s F_{K,s} = (1 - \delta_s) PK_{s,t-1} F_{K,s,t-1} + PI_s I_s \quad (0.172)$$

Energy costs in sector s

In first approximation the cost of energy correspond to the energy price. However if the producer is forward looking, she will integrate the anticipation of price increase in it definition of the user cost of energy. In this case the specification becomes

$$C_{E,s} = PE_s \quad (0.173)$$

Materials costs in sector s

$$C_{MAT,s} = PMAT_s \quad (0.174)$$

Aggregate cost of capital

$$C_K F_K = \sum_s C_{K,s} F_{K,s} \quad (0.175)$$

Aggregate cost of labor

$$C_L F_L = \sum_s C_{L,s} F_{L,s} \quad (0.176)$$

Aggregate cost of energy

$$C_E F_E = \sum_s C_{E,s} F_{E,s} \quad (0.177)$$

Aggregate cost of materials

$$C_{MAT} F_{MAT} = \sum_s C_{MAT,s} F_{MAT,s} \quad (0.178)$$

Gross wages paid by sector s including employees (but not employers)' social contribution

To derive the volume, we assume that the price is the consumer price

$$WAGES_s PWAGES_s = W_s F_{L,s} \quad (0.179)$$

Price Index for gross wages

$$PWAGES_s = P \quad (0.180)$$

Price of commodity c for household final consumption expenditure

$$PCH_c CH_c = PCHD_c CHD_c + PCHM_c CHM_c \quad (0.181)$$

Price of commodity c for government final consumption expenditure

$$PG_c G_c = PGD_c GD_c + PGM_c GM_c \quad (0.182)$$

Price of commodity c for exports use

$$PX_c X_c = PXD_c XD_c + PXM_c XM_c \quad (0.183)$$

Price of commodity c for sector s for intermediary consumption use

$$PCI_{c,s} CI_{c,s} = PCID_{c,s} CID_{c,s} + PCIM_{c,s} CIM_{c,s} \quad (0.184)$$

Materials price for sector s

$$PMAT_s F_{MAT,s} = \sum_{cm} PCI_{cm,s} CI_{cm,s} \quad (0.185)$$

Energy price for sector s

$$PE_s F_{E,s} = \sum_{ce} PCI_{ce,s} CI_{ce,s} \quad (0.186)$$

Selling price of commodity c

$YQS[c]$ is the volume of the production expressed at market price. It should not be seen as a composite of several "goods": production at base price, margins and taxes. Its does not increase when the volume of the margins and taxes increase. The price does instead. This is equivalent to assuming that $YQS[c]$ is always proportionnal to and $YQ[c]$ since the volume of margins and taxes depends on the latter. Writing it following the specification composite of several goods, $YQS[c] = YQ[c] + MGPD[c] + NTAXPD[c]$, would lead to inaccurate results since a decrease in the quantity of margins used per unit of production would not lead to a decrease of the selling price.

$$PYQS_c YQS_c = PYQ_c YQ_c + PMGPD_c MGPD_c + NTAXPD_c^{VAL} \quad (0.187)$$

Quantity of domestically produced commodity c expressed at selling price

$$\Delta(\log YQS_c) = \Delta(\log YQ_c) \quad (0.188)$$

Selling price for imported commodity c

$$PMS_c MS_c = PM_c M_c + NTAXPM_c^{VAL} + PMGPM_c MGPM_c \quad (0.189)$$

Quantity of imported commodity c expressed at selling price

$$\Delta(\log MS_c) = \Delta(\log M_c) \quad (0.190)$$

Price of the margins paid to commodity cc on domestically produced commodity c

We assume that the margins paid on domestic and imported commodities can be produced by domestic and foreign (using the import share of the margin received). The price of the margins paid to commodity cc is assumed commun to all commodity c .

$$PMGPD_{cc,c} MGR_{cc} = PMGRD_{cc} MGRD_{cc} + PMGRM_{cc} MGRM_{cc} \quad (0.191)$$

Price of the margins paid to commodity cc on imported commodity c

This price is the same as the one paid on domestic commodity because of the assumption given in the previous equation.

$$PMGPM_{cc,c} = PMGPD_{cc,c} \quad (0.192)$$

Price of margins received on domestically produced commodity c

$$PMGRD_c = PYQS_c \quad (0.193)$$

Price of margins received on imported commodity c

$$PMGRM_c = PMS_c \quad (0.194)$$

Price of domestically produced commodity c for sector s for intermediate consumption use

$$PCID_{c,s} = PYQS_c \quad (0.195)$$

Price of imported commodity c for sector s for intermediate consumption use

$$PCIM_{c,s} = PMS_c \quad (0.196)$$

Price of domestically produced commodity c for households final consumption expenditure

$$PCHD_c = PYQS_c \quad (0.197)$$

Price of imported commodity c for households final consumption expenditure

$$PCHM_c = PMS_c \quad (0.198)$$

Price of domestically produced commodity c for government final consumption expenditure

$$PGD_c = PYQS_c \quad (0.199)$$

Price of imported commodity c for government final consumption expenditure

$$PGM_c = PMS_c \quad (0.200)$$

Price of domestically produced commodity c for investment use

$$PID_{c,s} = PYQS_c \quad (0.201)$$

Price of imported commodity c for investment use

$$PIM_{c,s} = PMS_c \quad (0.202)$$

Price of domestically produced commodity c for export use

$$PXD_c = PYQS_c \quad (0.203)$$

Price of imported commodity c for export use

$$PXM_c = PMS_c \quad (0.204)$$

Price of domestically produced commodity c for change in inventories use

$$PDSD_c = PYQS_c \quad (0.205)$$

Price of imported commodity c for change in inventories use

$$PDSM_c = PMS_c \quad (0.206)$$

Price of imported commodity c

$$PM_c = TC.PWD_c \quad (0.207)$$

Notional wage in sector s

This general specification combines various wage equation found in the literature: the Phillips curve and the WS curve. The WS curve à la Layard et al. (2005) requires the following constraints : $RHO.W.P[s] = RHO.W.PROG[s] = 1$, $RHO.W.U[s] = RHO.W.Cons[s] = 0$.

$$\begin{aligned} \Delta(\log W_s^n) = & \rho_s^{W,Cons} + \rho_s^{W,P} \Delta(\log P) + \rho_s^{W,Pe} \Delta(\log P^e) \\ & + \rho_s^{W,PROG} \Delta(\log PROG_s^L) - \rho_s^{W,U} (UnR - DNAIRU) \\ & - \rho_s^{W,DU} \Delta(UnR) + \rho_s^{W,L} \Delta(\log F_{L,s} - \log F_L) \end{aligned} \quad (0.208)$$

Average wage

$$W.F_L = \left(\sum_s W_s F_{L,s} \right) \quad (0.209)$$

Consumer Price Index

$$P = PCH \quad (0.210)$$

Notional interest rate of the Central Bank (Taylor rule)

$$\Delta(R^n) = \rho^{Rdir,Cons} + \rho^{Rdir,P} \cdot \Delta\left(\frac{\Delta(P)}{P_{t-1}}\right) - \rho^{Rdir,UnR} \cdot \Delta(UnR) \quad (0.211)$$

Interest rate paid on capital by sector s

$$\Delta(R_s) = \Delta(R) \quad (0.212)$$

Interest rate paid by the Gouvernement on its debt

We assume a constant premium on the interest rate of the Central Bank

$$\Delta(r^{DEBT,G}) = \Delta(r) \quad (0.213)$$

0.4 Consumer

Disposable income before tax in value

The disposable income before tax is used as base for the income tax.

$$DISPINC^{BT,VAL} = PWAGES.WAGES + PROP^{INC,H,VAL} + SOC^{BENF,VAL} + TRSF^{HH,VAL} \quad (0.214)$$

Disposable income after tax in value

The definition of the disposable income after tax corresponds to the definition of "gross disposable income" defined in the annual account by institutional sector of Eurostat (b.6.g).

$$DISPINC^{AT,VAL} = DISPINC^{BT,VAL} - INC^{SOC,TAX,VAL} \quad (0.215)$$

Income & Social Taxes in value

$$INC^{SOC,TAX,VAL} = RINC^{SOC,TAX}.DISPINC^{BT,VAL} \quad (0.216)$$

Property incomes in value

$$PROP^{INC,H,VAL,n} = \varphi^{PROP^{INC,H}}.PNOS.NOS \quad (0.217)$$

Social benefits in value

$$SOC^{BENF,VAL} = RR^{POP}.W.PROG^L.P.POP + RR^{Un}.W.Un \quad (0.218)$$

Aggregate notional households final consumption in value

$$CH^{n,VAL} = DISPINC^{AT,VAL}.(1 - MPS^n) \quad (0.219)$$

Notional marginal propensity to save

$$\Delta(MPS^n) = \rho^{MPS,R} \cdot \Delta\left(R - \frac{\Delta(P)}{P_{t-1}}\right) + \rho^{MPS,UnR} \cdot \Delta(UnR) \quad (0.220)$$

Households final consumption of commodity c

$$(CH_c^n - NCH_c) PCH_c = \varphi_c^{MCH} (CH^{n,VAL} - PNCH.NCH) \quad (0.221)$$

Price of necessary households consumption of commodity c

$$PNCH.NCH = \sum_c PNCH_c NCH_c \quad (0.222)$$

Necessary households final consumption of commodity c

$$NCH = \sum_c NCH_c \quad (0.223)$$

Share of commodity c in the marginal household consumption

$$\Delta(\log \varphi_c^{MCH}) = (1 - \sigma^{LESCES}) \cdot \Delta\left(\log \frac{PCH_c}{PCH^{CES}}\right) \quad (0.224)$$

Share of commodity c in the household consumption

$$\varphi_c^{CH} = \frac{CH_c}{CH} \quad (0.225)$$

Consumption price (l'équation n'est pas compilée ???)

Households savings in value

$$SAV^{H,VAL} = DISPINC^{AT,VAL} - PCH.CH \quad (0.226)$$

Households savings rate

$$RSAV^{H,VAL} = \frac{SAV^{H,VAL}}{DISPINC^{AT,VAL}} \quad (0.227)$$

Households savings stock

$$Stock^{SAV,H,VAL} = Stock_{t-1}^{SAV,H,VAL} + SAV^{H,VAL} \quad (0.228)$$

0.5 Government

0.5.1 taxes

Net taxes on domestically produced commodity c in value

$$NTAXPD_c^{VAL} = RNTAXPD_c PYQ_c YQ_c \quad (0.229)$$

Net taxes on domestically produced commodity c in volume

$$NTAXPD_c = RNTAXPD_{c,t_0} YQ_c \quad (0.230)$$

Net taxes on imported commodity c in value

$$NTAXPM_c^{VAL} = RNTAXPM_c PM_c M_c \quad (0.231)$$

Net taxes on imported commodity c in volume

$$NTAXPM_c = RNTAXPM_{c,t_0} M_c \quad (0.232)$$

Net taxes on commodity c in value

$$NTAXP_c^{VAL} = NTAXPD_c^{VAL} + NTAXPM_c^{VAL} \quad (0.233)$$

Net taxes on commodity c in volume

$$NTAXP_c = NTAXPD_c + NTAXPM_c \quad (0.234)$$

Aggregate net taxes on commodity c in value

$$PNTAXP.NTAXP = \sum_c NTAXP_c^{VAL} \quad (0.235)$$

Aggregate net taxes on commodity c in volume

$$NTAXP = \sum_c NTAXP_c \quad (0.236)$$

Net taxes on production of sector s in value

$$NTAXI_s^{VAL} = RNTAXI_s PY_s Y_s \quad (0.237)$$

Net taxes on production of sector s in volume

$$NTAXI_s = RNTAXI_{s,t_0} Y_s \quad (0.238)$$

Aggregate net taxes on production (value & volume)

Net taxes on production in value

$$NTAXI^{VAL} = \sum_s NTAXI_s^{VAL} \quad (0.239)$$

Net taxes on production in volume

$$NTAXI = \sum_s NTAXI_s \quad (0.240)$$

Employers' social security contribution paid by sector s expressed in consumer price

$RSSC$ stands for employeRs' Social Security Contribution

$$RSSC_s PRSSC_s = W_s F_{L,s} RRSSC_s \quad (0.241)$$

Price of RSSC for sector s

$$PRSSC_s = P \quad (0.242)$$

Total employers' social security contribution expressed in consumer price

$$PRSSC.RSSC = \sum_s PRSSC_s RSSC_s \quad (0.243)$$

Price of RSSC

$$RSSC = \sum_s RSSC_s \quad (0.244)$$

Average employers' social security contribution rate

$$RRSSC = PRSSC \cdot \frac{RSSC}{(W.F_L)} \quad (0.245)$$

Government final consumption expenditure of commodity c

$$\Delta(\log G_c) = \Delta(\log EXP_G) \quad (0.246)$$

Notional Property incomes of the Government in value

$$PROP^{INC,G,VAL,n} = \varphi^{PROP^{INC,G}} \cdot PNOS.NOS \quad (0.247)$$

Incomes of the Government in value

$$\begin{aligned} INC^{G,VAL} = & PNTAX.PNTAX + NTAXI^{VAL} + INC^{SOC,TAX,VAL} \\ & + PRSSC.RSSC + PROP^{INC,G,VAL} \end{aligned} \quad (0.248)$$

Spendings of the Government in value

$$SPEND^{G,VAL} = PG.G + SOC^{BENF,VAL} + DEBT_{t-1}^{G,VAL} \left(\varphi_{t-1}^{RD^G} + r_{t-1}^{DEBT,G} \right) \quad (0.249)$$

Savings of the Government in value (Net lending/borrowing: published deficit/savings of the Government)

$$SAV^{G,VAL} = INC^{G,VAL} - SPEND^{G,VAL} \quad (0.250)$$

Primary balance of the Government in value (deficit).

It corresponds to the savings excluding the reimbursement and the interest on the debt

$$Bal^{G,Prim,VAL} = SAV^{G,VAL} + DEBT_{t-1}^{G,VAL} \left(\varphi_{t-1}^{RD^G} + r_{t-1}^{DEBT,G} \right) \quad (0.251)$$

$$Bal^{G,Prim,VAL,bis} = INC^{G,VAL} - (PG.G + SOC^{BENF,VAL}) \quad (0.252)$$

Total balance of the Government in value (deficit)

It corresponds to the saving excluding the reimbursement but not the interest on the debt

$$Bal^{G,Tot,VAL} = Bal^{G,Prim,VAL} - DEBT_{t-1}^{G,VAL} r_{t-1}^{DEBT,G} \quad (0.253)$$

Government's debt in value

It corresponds to the previous year debt minus the reimbursement of the debt and the government savings

$$DEBT^{G,VAL} = DEBT_{t-1}^{G,VAL} \left(1 - \varphi_{t-1}^{RD^G}\right) - SAV^{G,VAL} \quad (0.254)$$

Government's savings rate in value (in percent of GDP)

$$RSAV^{G,VAL} = \frac{SAV^{G,VAL}}{(PGDP.GDP)} \quad (0.255)$$

Primary balance of the Government in value (in percent of GDP)

$$RBal^{G,Prim,VAL} = \frac{Bal^{G,Prim,VAL}}{(PGDP.GDP)} \quad (0.256)$$

Total balance of the Government in value (in percent of GDP)

$$RBal^{G,Tot,VAL} = \frac{Bal^{G,Tot,VAL}}{(PGDP.GDP)} \quad (0.257)$$

Ratio of the Government's debt in value (in percent of GDP)

$$RDEBT^{G,VAL} = \frac{DEBT^{G,VAL}}{(PGDP.GDP)} \quad (0.258)$$

0.6 International Trade

This file provides the equations defining the allocation between domestic and imported goods per use. The differentiation per use allows for distinguishing import share per use and therefore a more realistic representation of the economy than model that assume a common import share. Indeed, the import share of export is generally smaller than for consumption.

0.6.1 Domestic demand

Received margins on domestically produced commodity c

$$MGRD_c = (1 - \varphi_c^{MGRM}) MGR_c \quad (0.259)$$

Private final consumption of domestically produced commodity c

$$CHD_c = (1 - \varphi_c^{CHM}) CH_c \quad (0.260)$$

Public final consumption of domestically produced commodity c

$$GD_c = (1 - \varphi_c^{GM}) G_c \quad (0.261)$$

Margins received from imported commodity c

$$MGRM_c = \varphi_c^{MGRM} MGR_c \quad (0.262)$$

Private final consumption of imported commodity c

$$CHM_c = \varphi_c^{CHM} CH_c \quad (0.263)$$

Public final consumption of imported commodity c

$$GM_c = \varphi_c^{GM} G_c \quad (0.264)$$

Import share of commodity c on received margins

$$\varphi_c^{MGRM} = \frac{1}{\left(1 + \frac{MGRD_c}{MGRM_{c,t_0}} \exp SUBST_c^{MGRM}\right)} \quad (0.265)$$

Import share of commodity c for household final consumption

$$\varphi_c^{CHM} = \frac{1}{\left(1 + \frac{CHD_c}{CHM_{c,t_0}} \exp SUBST_c^{CHM}\right)} \quad (0.266)$$

Import share φ_c of commodity c on the government final consumption

$$\varphi_c^{GM} = \frac{1}{\left(1 + \frac{GD_c}{GM_{c,t_0}} \exp SUBST_c^{GM}\right)} \quad (0.267)$$

Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for margins received

$$\Delta(SUBST_c^{n,MGRM}) = -\sigma_c^{MGRM} \Delta(\log PMGRD_c - \log PMGRM_c) \quad (0.268)$$

Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for households final consumption

$$\Delta(SUBST_c^{n,CHM}) = -\sigma_c^{CHM} \Delta(\log PCHD_c - \log PCHM_c) \quad (0.269)$$

Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for government final consumption

$$\Delta(SUBST_c^{n,GM}) = -\sigma_c^{GM} \Delta(\log PGD_c - \log PGM_c) \quad (0.270)$$

Intermediary consumption from sector s in domestically produced commodity c

$$CID_{c,s} = (1 - \varphi_{c,s}^{CIM}) CI_{c,s} \quad (0.271)$$

Investment from sector s in domestically produced commodity c

$$ID_{c,s} = (1 - \varphi_{c,s}^{IM}) I_{c,s} \quad (0.272)$$

Intermediary consumption from sector s in imported commodity c

$$CIM_{c,s} = \varphi_{c,s}^{CIM} CI_{c,s} \quad (0.273)$$

Investment from sector s in imported commodity c

$$IM_{c,s} = \varphi_{c,s}^{IM} I_{c,s} \quad (0.274)$$

Import share of intermediary consumption from sector s in domestically produced commodity c

$$\varphi_{c,s}^{CIM} = \frac{1}{\left(1 + \frac{CID_{c,s}}{CIM_{c,s,t_0}} \exp SUBST_{c,s}^{CIM}\right)} \quad (0.275)$$

Import share of intermediary consumption from sector s in imported commodity c

$$\varphi_{c,s}^{IM} = \frac{1}{\left(1 + \frac{ID_{c,s}}{IM_{c,s,t_0}} \exp SUBST_{c,s}^{IM}\right)} \quad (0.276)$$

Notional substitution effect induced by a change in the relative price between imported and domestic intermediary consumption in commodity c from the sector s

$$\Delta(SUBST_{c,s}^{n,CIM}) = -\sigma_{c,s}^{CIM} \Delta(\log PCID_{c,s} - \log PCIM_{c,s}) \quad (0.277)$$

Notional substitution effect induced by a change in the relative price between imported and domestic investment in commodity c from the sector s

$$\Delta(SUBST_{c,s}^{n,IM}) = -\sigma_{c,s}^{IM} \Delta(\log PID_{c,s} - \log PIM_{c,s}) \quad (0.278)$$

0.6.2 Exports

Exports of domestically produced commodity c

$$XD_c = (1 - \varphi_c^{XM}) X_c \quad (0.279)$$

Exports of imported commodity c

$$XM_c = \varphi_c^{XM} X_c \quad (0.280)$$

Import share of commodity c exports

$$\varphi_c^{XM} = \frac{1}{\left(1 + \frac{XD_c}{XM_{c,t_0}} \exp SUBST_c^{XM}\right)} \quad (0.281)$$

Notional substitution effect induced by a change in the relative price between imported and domestic products c for exports

$$\Delta (SUBST_c^{n,XM}) = -\sigma_c^{XM} \Delta (\log PXD_c - \log PXM_c) \quad (0.282)$$

Foreign demand for exports of commodity c

$$\Delta (\log X_c) = \Delta (\log WD_c) + \Delta (SUBST_c^X) \quad (0.283)$$

Notional substitution effect induced by a change in the relative price between export prices and (converted in domestic currency) international prices for the commodity c

$$\Delta (SUBST_c^{n,X}) = -\sigma_c^X \Delta (\log PX_c - \log TC.PWD_c) \quad (0.284)$$

Balance of trade of commodity c

$$Bal_c^{Trade,VAL} = PX_c X_c - PM_c M_c \quad (0.285)$$

Aggregate balance of trade

$$Bal^{Trade,VAL} = \sum_c Bal_c^{Trade,VAL} \quad (0.286)$$

Balance of trade (in percent of GDP)

$$RBal^{Trade,VAL} = \frac{Bal^{Trade,VAL}}{(PGDP.GDP)} \quad (0.287)$$

0.7 Demography

Working-age population

The working age population linearly grows with the total population

$$\Delta(\log WAPop) = \Delta(\log POP) \quad (0.288)$$

Labor force

The Labor force depends on a participation rate of the working-age population

$$LF = PARTR.WAPop \quad (0.289)$$

Labor force participation ratio

Because of discouraged worker effect, the participation ratio depends generally negatively on the unemployment rate

$$\Delta(PARTR^n) = \Delta(PARTR^{trend}) - \rho^{PART,UnR}.\Delta(UnR) \quad (0.290)$$

Employment (ILO definition)

In general, labor according to the national account differ from the employment according to the ILO definition. One reason is that labor is express in FTE (full time equivalent). To calculate the unemployment rate, one need to use the employment according to the ILO definition. We assume that the average work duration is constant over time, implying stability between the employment to labor ratio

$$\Delta(\log empl) = \Delta(\log F_L) \quad (0.291)$$

Unemployment

Unemployment is determined as the difference between the total active population with the one which is employed

$$Un = LF - Empl \quad (0.292)$$

Unemployment rate

The Unemployment rate is defined as the ratio between the total unemployment and the active population

$$UnR = \frac{Un}{LF} \quad (0.293)$$

0.8 Greenhouse gases emissions

This file provides the equations defining the path of Green House Gases (GHG) emissions. Emissions are defined for the following list: ghg = CO2 CH4 N2O SF6 HFC PFC. All emission types are expressed in CO2-equivalent to facilitate aggregation. For the same emission type (e.g. CO2), several equation are defined depending in the emission basis: intermediary consumption, household consumption or production.

Emissions ghg related to the intermediary consumption of commodity c by sector s

In practice only a few intermediaries generate emissions (e.g. coal, gas, petrol). $IEMS^{CI}_{ghg,c,s}$ is the corresponding emission intensity calibrated to 1 in the baseyear. It may change over time because of the increase of the share of biofuels.

$$\Delta(\log EMS^{CI}_{ghg,c,s}) = \Delta(\log CI_{c,s} IEMS^{CI}_{ghg,c,s}) \quad (0.294)$$

$$\Delta(\log EMS^{MAT}_{ghg,s}) = \Delta(\log F_{MAT,s} IEMS^{MAT}_{ghg,s}) \quad (0.295)$$

Emissions ghg related to the final production of sector s

This mainly correspond to the emissions from agriculture.

$$\Delta(\log EMS^Y_{ghg,s}) = \Delta(\log Y_s IEMS^Y_{ghg,s}) \quad (0.296)$$

Emissions ghg related to the household consumption c

$$\Delta(\log EMS^{CH}_{ghg,c}) = \Delta(\log CH_c IEMS^{CH}_{ghg,c}) \quad (0.297)$$

Emissions ghg related to the intermediary consumption of commodity c

$$EMS^{CI}_{ghg,c} = \sum_s EMS^{CI}_{ghg,c,s} \quad (0.298)$$

Emissions ghg related to the intermediary consumption by sector s

$$EMS^{CI}_{ghg,s} = \sum_c EMS^{CI}_{ghg,c,s} \quad (0.299)$$

Emissions of the greenhouse gas ghg related to the intermediary consumption

$$EMS_{ghg}^{CI} = \sum_s EMS_{ghg,s}^{CI} \quad (0.300)$$

$$EMS_{ghg}^{CI,bis} = \sum_c EMS_{ghg,c}^{CI} \quad (0.301)$$

Emissions of the greenhouse gas ghg related to the total material consumption

$$EMS_{ghg}^{MAT} = \sum_s EMS_{ghg,s}^{MAT} \quad (0.302)$$

Emissions of the greenhouse gas ghg related to the final production

$$EMS_{ghg}^Y = \sum_s EMS_{ghg,s}^Y \quad (0.303)$$

Emissions of the greenhouse gas ghg related to the household final consumption

$$EMS_{ghg}^{CH} = \sum_c EMS_{ghg,c}^{CH} \quad (0.304)$$

Aggregate emissions of the greenhouse gas ghg

$$EMS_{ghg} = EMS_{ghg}^{CI} + EMS_{ghg}^{MAT} + EMS_{ghg}^Y + EMS_{ghg}^{CH} \quad (0.305)$$

Aggregate emissions related to the intermediary consumption

$$EMS^{CI} = \sum_{ghg} EMS_{ghg}^{CI} \quad (0.306)$$

Aggregate emissions related to the material consumption

$$EMS^{MAT} = \sum_{ghg} EMS_{ghg}^{MAT} \quad (0.307)$$

Aggregate emissions related to the final production

$$EMS^Y = \sum_{ghg} EMS_{ghg}^Y \quad (0.308)$$

Aggregate emissions related to the households final consumption

$$EMS^{CH} = \sum_{ghg} EMS_{ghg}^{CH} \quad (0.309)$$

Aggregate emissions

$$EMS = EMS^{CI} + EMS^{MAT} + EMS^Y + EMS^{CH} \quad (0.310)$$

$$EMS^{bis} = \sum_{ghg} EMS_{ghg} \quad (0.311)$$

0.9 Other equations

0.9.1 Adjustment equations and anticipation

Mark-up in the sector s

$$\mu_s = \alpha_s^\mu \mu_s^n + (1 - \alpha_s^\mu) \mu_{s,t-1} \quad (0.312)$$

Expected inflation.

This equation defines the expected inflation and not the expected price. P^e does not necessary converge to P . If the wage equation is a WS curve, even in the very long term it may not converge.

$$\Delta(\log P^e) = \alpha^{P^e, P^1} \Delta(\log P_{t-1}) + (1 - \alpha^{P^e, P^1}) \Delta(\log P_{t-1}^e) \quad (0.313)$$

Expected production

$$\Delta (\log Y_s^e) = \alpha_s^{Ye,Y} \Delta (\log Y_s) + (1 - \alpha_s^{Ye,Y}) \Delta (\log Y_{s,t-1}^e) \quad (0.314)$$

Quantity of Labor, Energy and Material inputs in sector s

$$\log F_{f,s} = \alpha_{f,s}^{0,F} \log F_{f,s}^n + (1 - \alpha_{f,s}^{0,F}) (\log F_{f,s,t-1} + \Delta (\log F_{f,s}^e)) \quad (0.315)$$

Expected quantity of Labor, Energy and Material inputs in sector s

$$\Delta (\log F_{f,s}^e) = \alpha_{f,s}^{1,F} \Delta (\log F_{f,s,t-1}^e) + \alpha_{f,s}^{2,F} \Delta (\log F_{f,s,t-1}) + \alpha_{f,s}^{3,F} \Delta (\log F_{f,s}^n) \quad (0.316)$$

Capital stock of sector s

$$F_{K,s} = (1 - \delta_s) F_{K,s,t-1} + IA_s \quad (0.317)$$

Investment in sector s

$$\begin{aligned} \Delta (\log IA_s) = & \alpha_s^{IA,Ye} \Delta (\log Y_s^e) + \alpha_s^{IA,IA1} \Delta (\log IA_{s,t-1}) \\ & + \alpha_s^{IA,SUBST} \Delta (SUBST_{K,s}^F) \\ & + \alpha_s^{IA,Kn} (\log F_{K,s,t-1}^n - \log F_{K,s,t-1}) \end{aligned} \quad (0.318)$$

Households final consumption of commodity c

$$\log CH_c = \alpha_c^{0,CH} \log CH_c^n + (1 - \alpha_c^{0,CH}) (\log CH_{c,t-1} + \Delta (\log CH_c^e)) \quad (0.319)$$

Expected households final consumption of commodity c

$$\begin{aligned} \Delta (\log CH_c^e) = & \alpha_c^{1,CH} \Delta (\log CH_{c,t-1}^e) + \alpha_c^{2,CH} \Delta (\log CH_{c,t-1}) \\ & + \alpha_c^{3,CH} \Delta (\log CH_c^n) \end{aligned} \quad (0.320)$$

Production price of sector s

$$\log PY_s = \alpha_s^{0,PY} \log PY_s^n + (1 - \alpha_s^{0,PY}) (\log PY_{s,t-1} + \Delta(\log PY_s^e)) \quad (0.321)$$

Expected production price of sector s

$$\begin{aligned} \Delta(\log PY_s^e) = & \alpha_s^{1,PY} \Delta(\log PY_{s,t-1}^e) + \alpha_s^{2,PY} \Delta(\log PY_{s,t-1}) \\ & + \alpha_s^{3,PY} \Delta(\log PY_s^n) \end{aligned} \quad (0.322)$$

Wages of the sector s

$$\Delta(\log W_s) = \alpha_s^{W,W^n} \Delta(\log W_s^n) + \alpha_s^{W,W^1} \Delta(\log W_{s,t-1}) - \alpha_s^{W,W^1W^n} \log \frac{W_{s,t-1}}{W_{s,t-1}^n} \quad (0.323)$$

Labor participation ratio

$$PARTR = \alpha^{0,PARTR} . PARTR^n + (1 - \alpha^{0,PARTR}) . PARTR_{t-1} \quad (0.324)$$

Interest rate

$$R = \alpha^{0,R} . R^n + (1 - \alpha^{0,R}) . R_{t-1} \quad (0.325)$$

Households property income in value

$$\begin{aligned} \log PROP^{INC,H,VAL} = & \alpha^{0,PROP,INC,H,VAL} . \log PROP^{INC,H,VAL,n} \\ & + (1 - \alpha^{0,PROP,INC,H,VAL}) . \left(\log PROP_{t-1}^{INC,H,VAL} \right. \\ & \left. + \Delta(\log PROP^{INC,H,VAL,e}) \right) \end{aligned} \quad (0.326)$$

Expected Households property income in value

$$\begin{aligned} \Delta(\log PROP^{INC,H,VAL,e}) = & \alpha^{1,PROP,INC,H,VAL} . \Delta(\log PROP_{t-1}^{INC,H,VAL,e}) \\ & + \alpha^{2,PROP,INC,H,VAL} . \Delta(\log PROP_{t-1}^{INC,H,VAL}) \\ & + \alpha^{3,PROP,INC,H,VAL} . \Delta(\log PROP^{INC,H,VAL,n}) \end{aligned} \quad (0.327)$$

Government property incomes in value

$$\begin{aligned} \log PROP^{INC,G,VAL} &= \alpha^{0,PROP,INC,G,VAL} \cdot \log PROP^{INC,G,VAL,n} \\ &+ (1 - \alpha^{0,PROP,INC,G,VAL}) \cdot \left(\log PROP_{t-1}^{INC,G,VAL} \right. \\ &\quad \left. + \Delta \left(\log PROP^{INC,G,VAL,e} \right) \right) \end{aligned} \quad (0.328)$$

Expected Government property incomes in value

$$\begin{aligned} \Delta \left(\log PROP^{INC,G,VAL,e} \right) &= \alpha^{1,PROP,INC,G,VAL} \cdot \Delta \left(\log PROP_{t-1}^{INC,G,VAL,e} \right) \\ &+ \alpha^{2,PROP,INC,G,VAL} \cdot \Delta \left(\log PROP_{t-1}^{INC,G,VAL} \right) \\ &+ \alpha^{3,PROP,INC,G,VAL} \cdot \Delta \left(\log PROP^{INC,G,VAL,n} \right) \end{aligned} \quad (0.329)$$

Substitution effect of the production factor f in the sector s

$$SUBST_{f,s}^F = \alpha_{f,s}^{6,F} SUBST_{f,s}^{n,F} + (1 - \alpha_{f,s}^{6,F}) SUBST_{f,s,t-1}^F \quad (0.330)$$

Substitution effect of the domestic margin paid cc for the commodity c

$$SUBST_{cc,c}^{MGPD} = \alpha_{cc,c}^{6,MGPD} SUBST_{cc,c}^{n,MGPD} + (1 - \alpha_{cc,c}^{6,MGPD}) SUBST_{cc,c,t-1}^{MGPD} \quad (0.331)$$

Substitution effect on the imported margin paid cc for the commodity c

$$SUBST_{cc,c}^{MGPM} = \alpha_{cc,c}^{6,MGPM} SUBST_{cc,c}^{n,MGPM} + (1 - \alpha_{cc,c}^{6,MGPM}) SUBST_{cc,c,t-1}^{MGPM} \quad (0.332)$$

Substitution effect on the energy intermediate consumption ce in the sector s

$$SUBST_{ce,s}^{CI} = \alpha_{ce,s}^{6,CI} SUBST_{ce,s}^{n,CI} + (1 - \alpha_{ce,s}^{6,CI}) SUBST_{ce,s,t-1}^{CI} \quad (0.333)$$

Substitution effect on the transportation intermediate consumption ce in the sector s

$$SUBST_{ct,s}^{CI} = \alpha_{ct,s}^{6,CI} SUBST_{ct,s}^{n,CI} + (1 - \alpha_{ct,s}^{6,CI}) SUBST_{ct,s,t-1}^{CI} \quad (0.334)$$

Substitution effect on the imported margin received for the commodity c

$$SUBST_c^{MGRM} = \alpha_c^{6,MGRM} SUBST_c^{n,MGRM} + (1 - \alpha_c^{6,MGRM}) SUBST_{c,t-1}^{MGRM} \quad (0.335)$$

Substitution effect on the imported households final consumption for the commodity c

$$SUBST_c^{CHM} = \alpha_c^{6,CHM} SUBST_c^{n,CHM} + (1 - \alpha_c^{6,CHM}) SUBST_{c,t-1}^{CHM} \quad (0.336)$$

Substitution effect on the imported government final consumption for the commodity c

$$SUBST_c^{GM} = \alpha_c^{6,GM} SUBST_c^{n,GM} + (1 - \alpha_c^{6,GM}) SUBST_{c,t-1}^{GM} \quad (0.337)$$

Substitution effect on the government final consumption for the imported commodity c

$$SUBST_c^{XM} = \alpha_c^{6,XM} SUBST_c^{n,XM} + (1 - \alpha_c^{6,XM}) SUBST_{c,t-1}^{XM} \quad (0.338)$$

Substitution effect on the intermediate consumption for the imported commodity c in the sector s

$$SUBST_{c,s}^{CIM} = \alpha_{c,s}^{6,CIM} SUBST_{c,s}^{n,CIM} + (1 - \alpha_{c,s}^{6,CIM}) SUBST_{c,s,t-1}^{CIM} \quad (0.339)$$

Substitution effect on the investment for the imported commodity c in the sector s

$$SUBST_{c,s}^{IM} = \alpha_{c,s}^{6,IM} SUBST_{c,s}^{n,IM} + (1 - \alpha_{c,s}^{6,IM}) SUBST_{c,s,t-1}^{IM} \quad (0.340)$$

Substitution effect on the exports of the commodity c

$$SUBST_c^X = \alpha_c^{6,X} SUBST_c^{n,X} + (1 - \alpha_c^{6,X}) SUBST_{c,t-1}^X \quad (0.341)$$

Glossary

$Bal^{G,Prim,VAL}$	Primary balance of the Government in value (deficit).
$Bal^{G,Prim,VAL,bis}$	
$Bal^{G,Tot,VAL}$	Total balance of the Government in value (deficit)
$Bal^{Trae,VAL}$	Aggregate balance of trade
$Bal_c^{Trae,VAL}$	Balance of trade of commodity c
$C_{E,s}$	Energy costs in sector s
C_E	Aggregate cost of energy
$C_{K,s}$	Capital cost in sector s
C_K	Aggregate cost of capital
$C_{L,s}$	Labor cost in sector s
C_L	Aggregate cost of labor
$C_{MAT,s}$	Materials costs in sector s
C_{MAT}	Aggregate cost of materials
CH	Total quantity of commodities for household final consumption expenditure
CH_c^e	Expected households final consumption of commodity c
$CH^{n,VAL}$	Aggregate notional households final consumption in value
CH_c^n	Households final consumption of commodity c
CH_c	Households final consumption of commodity c
CHD	Total quantity of domestically produced commodities for household final consumption expenditure
CHD_c	Private final consumption of domestically produced commodity c

CHM	Total quantity of imported commodities for households final consumption expenditure
CHM_c	Private final consumption of imported commodity c
CI	Total quantity of commodities for intermediate consumption use
CI_c	Quantity of commodity c expressed at market price for intermediate consumption use
$CI_{ce,s}$	Energy input demand by type of energy ce by sector s
$CI_{cmo,s}$	Demand for material commodity cmo by sector s
$CI_{ct,s}$	Demand for transport commodity ct by sector s
CI_s	Quantity of commodities for intermediate consumption use by the sector s expressed at basic price
CI^{bis}	
CID	Total quantity of domestically produced commodities for intermediate consumption use
$CID_{c,s}$	Intermediary consumption from sector s in domestically produced commodity c
CID_c	Quantity of domestically produced commodity c for intermediary consumption use expressed at market price
CID_s	Quantity of domestically produced commodities for intermediate consumption use by the sector s expressed at basic price
CIM	Total quantity of imported commodities for intermediate consumption use
$CIM_{c,s}$	Intermediary consumption from sector s in imported commodity c

CIM_c	Quantity of imported commodity c for intermediary consumption use expressed at market price
CIM_s	Quantity of imported commodities for intermediate consumption use by the sector s expressed at basic price
CU_s^n	Notional unit cost of production in sector s
CU_s	Unit cost of production in sector s
CUR_s	Capacity Utilisation ratio of the sector s
$DEBT^{G,VAL}$	Government's debt in value
$DISPINC^{AT,VAL}$	Disposable income after tax in value
$DISPINC^{BT,VAL}$	Disposable income before tax in value
DS	Total quantity of commodities for change in inventories use
DS_c	Quantity of commodity c expressed at market price for change in inventories use
DSD	Total quantity of domestically produced commodities for change in inventories use
DSM	Total quantity of imported commodities for change in inventories use
$empl$	Employment (ILO definition)
EMS	Aggregate emissions
EMS^{CH}	Aggregate emissions related to the households final consumption
$EMS_{ghg,c}^{CH}$	Emissions ghg related to the household consumption c
EMS_{ghg}^{CH}	Emissions of the greenhouse gas ghg related to the household final consumption
EMS^{CI}	Aggregate emissions related to the intermediary consumption

$EMS_{ghg,c,s}^{CI}$	Emissions ghg related to the intermediary consumption of commodity c by sector s
$EMS_{ghg,c}^{CI}$	Emissions ghg related to the intermediary consumption of commodity c
$EMS_{ghg,s}^{CI}$	Emissions ghg related to the intermediary consumption by sector s
EMS_{ghg}^{CI}	Emissions of the greenhouse gas ghg related to the intermediary consumption
$EMS_{ghg}^{CI,bis}$	
EMS^{MAT}	Aggregate emissions related to the material consumption
$EMS_{ghg,s}^{MAT}$	
EMS_{ghg}^{MAT}	Emissions of the greenhouse gas ghg related to the total material consumption
EMS^Y	Aggregate emissions related to the final production
$EMS_{ghg,s}^Y$	Emissions ghg related to the final production of sector s
EMS_{ghg}^Y	Emissions of the greenhouse gas ghg related to the final production
EMS_{ghg}	Aggregate emissions of the greenhouse gas ghg
EMS^{bis}	
$F_{f,s}^e$	Expected quantity of Labor, Energy and Material inputs in sector s
$F_{f,s}^n$	Demand for production factor f of sector s
F_E	Aggregate energy input
$F_{f,s}$	Quantity of Labor, Energy and Material inputs in sector s
$F_{K,s}$	Capital stock of sector s
F_K	Aggregate capital input

F_L	Aggregate labor input
F_{MAT}	Aggregate materials input
G	Total quantity of commodities for government final consumption expenditure
G_c	Government final consumption expenditure of commodity c
GD	Total quantity of domestically produced commodities for government final consumption expenditure
GD_c	Public final consumption of domestically produced commodity c
GDP	Total GDP from expenditure approach
GDP_c	GDP of commodity c from expenditure approach
$GDP4$	GDP price from income approach
GDP^{bis}	
GDP^{ter}	GDP price from production approach
GM	Total quantity of imported commodities for government final consumption expenditure
GM_c	Public final consumption of imported commodity c
GOS	Total Gross Operating Surplus
GOS_s^{VAL}	Gross operating surplus of sector s expressed in value
GOS_s	Gross operating surplus of sector s expressed in volume
$GR_{E,s}^{PROG}$	Endogenous energy efficiency
I	Total quantity of commodities for investment use
$I_{c,s}$	Investment use of commodity c by sector s
I_c	Quantity of commodity c expressed at market price for investment use

I_s	Total quantity of commodities for investment use by the sector s expressed at investment price
IA_s	Investment in sector s
I^{bis}	
ID	Total quantity of domestically produced commodities for investment use
$ID_{c,s}$	Investment from sector s in domestically produced commodity c
ID_c	Quantity of imported commodity c for investment use expressed at market price
ID_s	Quantity of domestically produced commodities for investment use by the sector s expressed at investment price of domestically produced commodities
IM	Total quantity of imported commodities for investment use
$IM_{c,s}$	Investment from sector s in imported commodity c
IM_c	Quantity of imported commodity c for investment use expressed at market price
IM_s	Quantity of imported commodities for investment use by the sector s expressed at investment price of imported commodities
$INC^{G,VAL}$	Incomes of the Government in value
$INC^{SOC,TAX,VAL}$	Income & Social Taxes in value
LF	Labor force
M	Total imported commodities expressed at basic price
M_c	Quantity of imports of commodity c expressed at imports price

μ_s^n	Notional mark-up of the sector s
μ_s^{n2}	Notional mark-up of the sector s (definition 2)
μ_c	Average mark-up on commodity c
μ_s	Mark-up in the sector s
M_c^{bis}	
$MGP_{cc,c}$	Margins paid to commodity cc on commodity c expressed at margin paid price
$MGPD$	Quantity of margins paid on domestically produced commodities
$MGPD_c$	Quantity of margins paid on domestically produced commodity c
$MGPD_{cc,c}$	Margins paid to commodity cc on the domestic commodity c
$MGPM$	Quantity of margins paid on imported commodities
$MGPM_c$	Quantity of margins paid on imported commodity c
$MGPM_{m,c}$	Margins paid to commodity m on the imported commodity c
MGR	Total quantity of margins on commodities
MGR_{cc}	Margins received by commodity cc expressed at margin received price
MGR_c^{bis}	
$MGRD$	Total quantity of margins received on domestically produced commodities
$MGRD_c$	Received margins on domestically produced commodity c
$MGRM$	Total quantity of margins received on imported commodities
$MGRM_c$	Margins received from imported commodity c

MPS^n	Notional marginal propensity to save
MS_c	Quantity of imported commodity c expressed at selling price
NCH	Necessary households final consumption of commodity c
NOS	Total Net Operating Surplus
NOS_s^{VAL}	Net operating surplus of sector s expressed in value
NOS_s	Net operating surplus of sector s expressed in volume
$NTAXI$	Net taxes on production in volume
$NTAXI^{VAL}$	Net taxes on production in value
$NTAXI_s^{VAL}$	Net taxes on production of sector s in value
$NTAXI_s$	Net taxes on production of sector s in volume
$NTAXP$	Aggregate net taxes on commodity c in volume
$NTAXP_c^{VAL}$	Net taxes on commodity c in value
$NTAXP_c$	Net taxes on commodity c in volume
$NTAXPD_c^{VAL}$	Net taxes on domestically produced commodity c in value
$NTAXPD_c$	Net taxes on domestically produced commodity c in volume
$NTAXPM_c^{VAL}$	Net taxes on imported commodity c in value
$NTAXPM_c$	Net taxes on imported commodity c in volume
P	Consumer Price Index
P^e	Expected inflation.
$PARTR$	Labor participation ratio
$PARTR^n$	Labor force participation ratio
PCH	Aggregate market price of commodities for household final consumption expenditure

PCH^{CES}	Consumption price (l'équation n'est pas compilée ???)
PCH_c	Price of commodity c for household final consumption expenditure
$PCHD$	Aggregate market price on domestically produced commodities for households final consumption expenditure
$PCHD_c$	Price of domestically produced commodity c for households final consumption expenditure
$PCHM$	Aggregate market price on imported commodities for households final consumption expenditure
$PCHM_c$	Price of imported commodity c for households final consumption expenditure
PCI	Aggregate market price of commodities for intermediate consumption use
$PCI_{c,s}$	Price of commodity c for sector s for intermediary consumption use
PCI_c	Market price of commodity c for intermediate consumption use
PCI_s	Aggregate basic price of commodities for intermediate consumption use by the sector s
PCI^{bis}	Intermediary raw material from sector aggregation (value & volume) : NO COMMENT
$PCID$	Aggregate market price on domestically produced commodities for intermediate consumption use
$PCID_{c,s}$	Price of domestically produced commodity c for sector s for intermediate consumption use
$PCID_c$	Market price for the domestically produced commodity c for intermediary consumption use

$PCID_s$	Aggregate basic price of domestically produced commodities for intermediate consumption use by the sector s
$PCIM$	Aggregate market price on imported commodities for intermediate consumption use
$PCIM_{c,s}$	Price of imported commodity c for sector s for intermediate consumption use
$PCIM_c$	Market price for imported commodity c for intermediary consumption use
$PCIM_s$	Aggregate basic price of imported commodities for intermediate consumption use by the sector s
PDS	Aggregate market price of commodities for change in inventories use
PDS_c	Market price of commodity c for change in inventories use
$PDSD$	Aggregate market price on domestically produced commodities for change in inventories use
$PDSD_c$	Price of domestically produced commodity c for change in inventories use
$PDSM$	Aggregate market price on imported commodities for change in inventories use
$PDSM_c$	Price of imported commodity c for change in inventories use
PE_s	Energy price for sector s
PG	Aggregate market price of commodities for government final consumption expenditure
PG_c	Price of commodity c for government final consumption expenditure
PGD	Aggregate market price on domestically produced commodities for government final consumption expenditure

PGD_c	Price of domestically produced commodity c for government final consumption expenditure
$PGDP$	Total GDP price from expenditure approach
$PGDP_c$	GDP price of commodity c from expenditure approach
$PGDP4$	Total GDP from income approach
$PGDP^{bis}$	Agregated GDP (value & volume) calculated from the GDP per using commodity (NO COMMENT ?)
$PGDP^{ter}$	Total GDP from production approach
PGM	Aggregate market price on imported commodities for government final consumption expenditure
PGM_c	Price of imported commodity c for government final consumption expenditure
$PGOS$	Aggregate price of Gross Operating Surplus
φ_c^{CH}	Share of commodity c in the household consumption
φ_c^{CHM}	Import share of commodity c for household final consumption
$\varphi_{c,s}^{CIM}$	Import share of intermediary consumption from sector s in domestically produced commodity c
φ_c^{GM}	Import share φ_c of commodity c on the government final consumption
$\varphi_{c,s}^{IM}$	Import share of intermediary consumption from sector s in imported commodity c
φ_c^{MCH}	Share of commodity c in the marginal household consumption
$\varphi_{m,c}^{MGPD}$	market share of the margin-making sector m for the commodity c

$\varphi_{m,c}^{MGPM}$	share of the margin type m on total margins paid on the domestic commodity c
φ_c^{MGRM}	Import share of commodity c on received margins
$\varphi_{ct,s}^{TRSP}$	Share for transport ct use in total transport by sector s
φ_c^{XM}	Import share of commodity c exports
$\varphi_{E,ce,s}$	Share of energy input ce on total energy use by sector s
$\varphi_{f,s}$	Share of production factor f of sector s
PI	Aggregate market price of commodities for investment use
PI_c	Market price of commodity c for investment use
PI_s	Aggregate investment price of commodities for investment use by the sector s
PI^{bis}	Investment from sector aggregation (value & volume) (summed directly on the aggregate per product c). For verification: (NO COMMENT ?)
PID	Aggregate market price on domestically produced commodities for investment use
$PID_{c,s}$	Price of domestically produced commodity c for investment use
PID_c	Market price for domestically produced commodity c for investment use
PID_s	Aggregate investment price of domestically produced commodities for investment use by the sector s
PIM	Aggregate market price on imported produced commodities for investment use
$PIM_{c,s}$	Price of imported commodity c for investment use

PIM_c	Market price for imported commodity c for investment use
PIM_s	Aggregate investment price of imported commodities for investment use by the sector s
PK_s	Price of capital in sector s
PM	Aggregate basic price of imported commodities
PM_c	Price of imported commodity c
$PMAT_s$	Materials price for sector s
PM_c^{bis}	Same variable calculated from volumes. For verification. (NO COMMENT?)
$PMGP_{cc,c}$	Price of margins paid to commodity cc on commodity c
$PMGPD$	Aggregate price of margins paid on domestically produced commodity c
$PMGPD_c$	price for margins paid on domestically produced commodity c
$PMGPD_{cc,c}$	Price of the margins paid to commodity cc on domestically produced commodity c
$PMGPM$	Aggregate price of margins paid on imported commodities
$PMGPM_c$	price for margins paid on imported commodity c
$PMGPM_{cc,c}$	Price of the margins paid to commodity cc on imported commodity c
$PMGR$	Aggregate market price of margins on commodities
$PMGR_{cc}$	Price of margins received by commodity cc
$PMGR_c^{bis}$	Same variable calculated from values & volumes. For verification. (NO COMMENT ?)
$PMGRD$	Aggregate market price for margins received on domestically produced commodities

$PMGRD_c$	Price of margins received on domestically produced commodity c
$PMGRM$	Aggregate market price for margins received on imported commodities
$PMGRM_c$	Price of margins received on imported commodity c
PMS_c	Selling price for imported commodity c
$PNCH$	Price of necessary households consumption of commodity c
$PNOS$	Aggregate net operating surplus price
$PNTAXP$	Aggregate net taxes on commodity c in value
PQ	Aggregate market price of commodities
PQ_c	Market price of commodity c
PQD	Aggregate market price for domestically produced commodities
PQD_c	Market price for the domestically produced commodity c
PQM	Aggregate market price for imported commodities
PQM_c	Market price for imported commodity c
$PROG_{f,s}$	Technical progress of the production factor f in the sector s
$PROP^{INC,G,VAL}$	Government property incomes in value
$PROP^{INC,G,VAL,e}$	Expected Government property incomes in value
$PROP^{INC,G,VAL,n}$	Notional Property incomes of the Government in value
$PROP^{INC,H,VAL}$	Households property income in value
$PROP^{INC,H,VAL,e}$	Expected Households property income in value
$PROP^{INC,H,VAL,n}$	Property incomes in value

$PRSSC$	Total employers' social security contribution expressed in consumer price
$PRSSC_s$	Price of RSSC for sector s
PVA	Aggregate value-added price
$PWAGES$	Aggregate gross wages paid by sector s including employees (but not employers)' social contribution
$PWAGES_s$	Price Index for gross wages
PX	Aggregate market price of commodities for exports use
PX_c	Price of commodity c for exports use
PXD	Aggregate market price on domestically produced commodities for exports use
PXD_c	Price of domestically produced commodity c for export use
PXM	Aggregate market price on imported commodities for exports use
PXM_c	Price of imported commodity c for export use
PY	Aggregate production price for all sectors
PY_s^e	Expected production price of sector s
PY_s^n	Notional production price of sector s
PY_s	Production price of sector s
PYQ	Aggregate basic price of domestically produced commodities
PYQ_c	Domestic production price of commodity c
PYQ_c^{bis}	Same variable calculated from values & volumes. For verification. (NO COMMENT ?)
$PYQS_c$	Selling price of commodity c
Q	Total quantity of commodities
Q_c	Quantity of commodity c expressed at market price

QD	Total quantity of domestically produced commodities
QD_c	Quantity of domestically produced commodity c expressed at market price
QM	Total quantity of imported commodities
QM_c	Quantity of imported commodity c expressed at market price
R	Interest rate
$r^{DEBT,G}$	Interest rate paid by the Government on its debt
R^n	Notional interest rate of the Central Bank (Taylor rule)
R_s	Interest rate paid on capital by sector s
$RBal^{G,Prim,VAL}$	Primary balance of the Government in value (in percent of GDP)
$RBal^{G,Tot,VAL}$	Total balance of the Government in value (in percent of GDP)
$RBal^{Trae,VAL}$	Balance of trade (in percent of GDP)
$RDEBT^{G,VAL}$	Ratio of the Government's debt in value (in percent of GDP)
$RRSSC$	Average employers' social security contribution rate
$RSAG^{G,VAL}$	Government's savings rate in value (in percent of GDP)
$RSAG^{H,VAL}$	Households savings rate
$RSSC$	Price of RSSC
$RSSC_s$	Employers' social security contribution paid by sector s expressed in consumer price
$SAV^{G,VAL}$	Savings of the Government in value (Net lending/borrowing: published deficit/savings of the Government)

$SAV^{H,VAL}$	Households savings in value
$SOC^{BENF,VAL}$	Social benefits in value
$SPEND^{G,VAL}$	Spending of the Government in value
$Stock^{SAV,H,VAL}$	Households savings stock
$SUBST_c^{CHM}$	Substitution effect on the imported households final consumption for the commodity c
$SUBST_{ce,s}^{CI}$	Substitution effect on the energy intermediate consumption ce in the sector s
$SUBST_{ct,s}^{CI}$	Substitution effect on the transportation intermediate consumption ce in the sector s
$SUBST_{c,s}^{CIM}$	Substitution effect on the intermediate consumption for the imported commodity c in the sector s
$SUBST_{f,s}^F$	Substitution effect of the production factor f in the sector s
$SUBST_c^{GM}$	Substitution effect on the imported government final consumption for the commodity c
$SUBST_{c,s}^{IM}$	Substitution effect on the investment for the imported commodity c in the sector s
$SUBST_{cc,c}^{MGPD}$	Substitution effect of the domestic margin paid cc for the commodity c
$SUBST_{cc,c}^{MGPM}$	Substitution effect on the imported margin paid cc for the commodity c
$SUBST_c^{MGRM}$	Substitution effect on the imported margin received for the commodity c
$SUBST_c^{n,CHM}$	Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for households final consumption

$SUBST_{ce,s}^{n,CI}$	Notional substitution effect between the energy commodity ce and the over energy commodities cee for the sector s
$SUBST_{ct,s}^{n,CI}$	Notional substitution effect between the transport ct and the over transports cct for the sector s
$SUBST_{c,s}^{n,CIM}$	Notional substitution effect induced by a change in the relative price between imported and domestic intermediary consumption in commodity c from the sector s
$SUBST_{f,s}^{n,F}$	Notional substitution effect between the input f and the over inputs ff
$SUBST_c^{n,GM}$	Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for government final consumption
$SUBST_{c,s}^{n,IM}$	Notional substitution effect induced by a change in the relative price between imported and domestic investment in commodity c from the sector s
$SUBST_{m,c}^{n,MGPD}$	Notional substitution between margin-making sectors m for the domestically produced commodity c
$SUBST_{m,c}^{n,MGPM}$	Notional substitution effect between the margin-making sector m and the over margin-makings sectors mm for the imported commodity c
$SUBST_c^{n,MGRM}$	Notional substitution effect induced by a change in the relative price between imported and domestically produced commodity c for margins received
$SUBST_c^{n,X}$	Notional substitution effect induced by a change in the relative price between export prices and (converted in domestic currency) international prices for the commodity c

$SUBST_c^{n, XM}$	Notional substitution effect induced by a change in the relative price between imported and domestic products c for exports
$SUBST_c^X$	Substitution effect on the exports of the commodity c
$SUBST_c^{XM}$	Substitution effect on the government final consumption for the imported commodity c
$TRSP_s$	Demand for transport commodities by sector s
Un	Unemployment
UnR	Unemployment rate
VA	Total value-added expressed at value-added price
VA_s^{VAL}	Added-value of sector s expressed in value
VA_s	Added-value of sector s expressed in volume
W	Average wage
W_s^n	Notional wage in sector s
W_s	Wages of the sector s
$WAGES$	
$WAGES_s$	Gross wages paid by sector s including employees (but not employers)' social contribution
$WAPop$	Working-age population
X	Total quantity of commodities for exports use
X_c	Foreign demand for exports of commodity c
XD	Total quantity of domestically produced commodities for exports use
XD_c	Exports of domestically produced commodity c
XM	Total quantity of imported commodities for exports use
XM_c	Exports of imported commodity c

Y	Total quantity of production expressed at production price
Y_s^e	Expected production
$Y_{c,s}$	Production of commodity c by sector s
Y_s	Quantity of commodities produced from the sector s expressed at the production price
$YCAP_s$	Production capacity of the sector s
YQ	Total domestic production expressed at basic price
YQ_c	Quantity of production of commodity c expressed at domestic production price
YQ_c^{bis}	
YQS_c	Quantity of domestically produced commodity c expressed at selling price