1 Integration of an Emission Trading Scheme

Nominal price of emissions permits

$$P^{ETS,nominal} = \left(\frac{P^{ETS}}{1000000}\right).PGDP \tag{1.1}$$

Quantity of freely allocated permits to sector s For each sector, the quantity of free permits is defined as a share of emissions that are eligible to the emission trading scheme.

$$Q_s^{ETS,free} = share_s^{free}\ share_s^{ETS}\ EMS_s \tag{1.2}$$

Quantity of emissions permits required for sector s **relative to its ce2 energy consumption**

$$Q_{ce2,s}^{ETS} = \left(share_s^{ETS}\ EMS_{ce2,s}\right) - Q_s^{ETS,free}\ \frac{EMS_{ce2,s}}{EMS_s} \tag{1.3}$$

Nominal value of emissions permits bought by sector s **due to ce2 consumption**

$$ETS_{ce2,s}^{VAL} = \left(P^{ETS,nominal}.Q_{ce2,s}^{ETS}\right) \tag{1.4}$$

Nominal value of emissions permits required for sector s

$$ETS_s^{VAL} = \sum_{ce2} ETS_{ce2,s}^{VAL} \tag{1.5}$$

Total nominal value of emissions permits on the trading market

$$ETS^{VAL,TOT} = \sum_{s} ETS_s^{VAL} \tag{1.6}$$

1.1 Scenario 1 : price signal

We overwrite the equation of the price block in order to add the ETS cost (energy ce2 used in activity s). We only consider energy goods ce2 - and not ce - since intermediary consumption of electricity does not induce dioxyde emissions.

Price of ce2 energy consumption in sector s

$$PE_{ce2,s}\ E_{ce2,s} = PED_{ce2}\ ED_{ce2,s} + PEM_{ce2}\ EM_{ce2,s} + ETS_{ce2,s}^{VAL,SEC} \tag{1.7}$$

1.2 Scenario 2 : implicit production subvention

We overwrite the production cost equation of the price block in order to consider the freely allocated permits as an implicit subvention on production.

Nominal production prices of covered sectors

$$PY_s^n\, Y_s = \big(CK_s\, K_s + CL_s\, L_s\, PROG_s^L + PE_s\, E_s + PMAT_s\, MAT_s + PIY_s\, IY_s + PSY_s\, SY_s + PIS_s\, IS_s - P^{ETS,nominal}.Q_s^{ETS,free}\big)\ (1 + TMD_s) \tag{1.8}$$

1.3 Government budget

We overwrite the equation in order to add the aggregated value of bought permits to the revenue of the government.

Government revenues

$$INC^{G,VAL} = PNTAXC.NTAXC + NTAXS^{VAL} + INC^{SOC,TAX,VAL} + PRSC.RSC + PROP^{INC,G,VAL} + ETS^{VAL,TOT} \tag{1.9}$$

Employers' social security contribution paid by sector s

$$RSC_s\ PRSC_s = W_s\ F_{L,s}\ RRSC_s - ETS_s^{VAL} \tag{1.10}$$

Necessary (minimum) households' final consumption for construction commodity *ccon*

$$NCH_{ccon} = PNewBUIL_{t_0}\ NewBUIL + PREHAB_{t_0}\ REHAB + CH_{CCON}^{OTH} \tag{1.11}$$

2 Exogenous variables

2.1. $share_s^{free}$ – **Percentage of freely allocated permits to sector** s

For each sector, the quantity of free permits is defined as a share of emissions that are eligible to the emission trading scheme.

2.2. $alpha^{exo}$ – **Alpha variable (used as a test for exogenous variable documentation)**

Test exogenous variable

3 Glossary

$alpha^{exo}$	Alpha variable (used as a test for exogenous variable documentation)	2.2,	3
$ETS^{VAL}_{ce2,s}$	Nominal value of emissions permits bought by sector s due to ce2 consumption	1.4,	1
ETS^{VAL}_{s}	Nominal value of emissions permits required for sector s	1.5,	1
$ETS^{VAL,TOT}$	Total nominal value of emissions permits on the trading market	1.6,	1
$INC^{G,VAL}$	Government revenues	1.9,	2
NCH_{ccon}	Necessary (minimum) households' final consumption for construction commodity *ccon*	1.11,	2
$P^{ETS,nominal}$	Nominal price of emissions permits	1.1,	1
$PE_{ce2,s}$	Price of ce2 energy consumption in sector s	1.7,	1
PY^{n}_{s}	Nominal production prices of covered sectors	1.8,	2
$Q^{ETS}_{ce2,s}$	Quantity of emissions permits required for sector s relative to its ce2 energy consumption	1.3,	1
$Q^{ETS,free}_{s}$	Quantity of freely allocated permits to sector s	1.2,	1
RSC_s	Employers' social security contribution paid by sector s	1.10,	2
$share^{free}_{s}$	Percentage of freely allocated permits to sector s	2.1,	3