



Trade Price Definitions in ANARRES_t



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Outline

- ANARRES_t SAMs
 - Structure
 - Africa SAM
- ANARRES_t Trade prices
 - Imports
 - Exports
- Globe region prices
 - Imports
 - Exports
- Understanding



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ANARRES_t SAMs

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ANARRES_t Regional SAM

	Com'dities	Activities	Factors	Private H'hold	Taxes	Govt	Invest	RoW	Globe
Commodities		Int'diate Inputs		Private demand		Govt Demand	Invest demand	Exports (fob)	Margin Exports
Activities	Supply								
Factors		Factor payments							
Private H'hold			Factor incomes						
Taxes	Product taxes	Activity Taxes		Income Taxes					
Govt					Tax revenue				
Savings			Dep'tion	Savings		Savings		Trade balance	Margin trade balance
RoW	Imports (fob)								
Globe	Margins								

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Trade Prices - Exports

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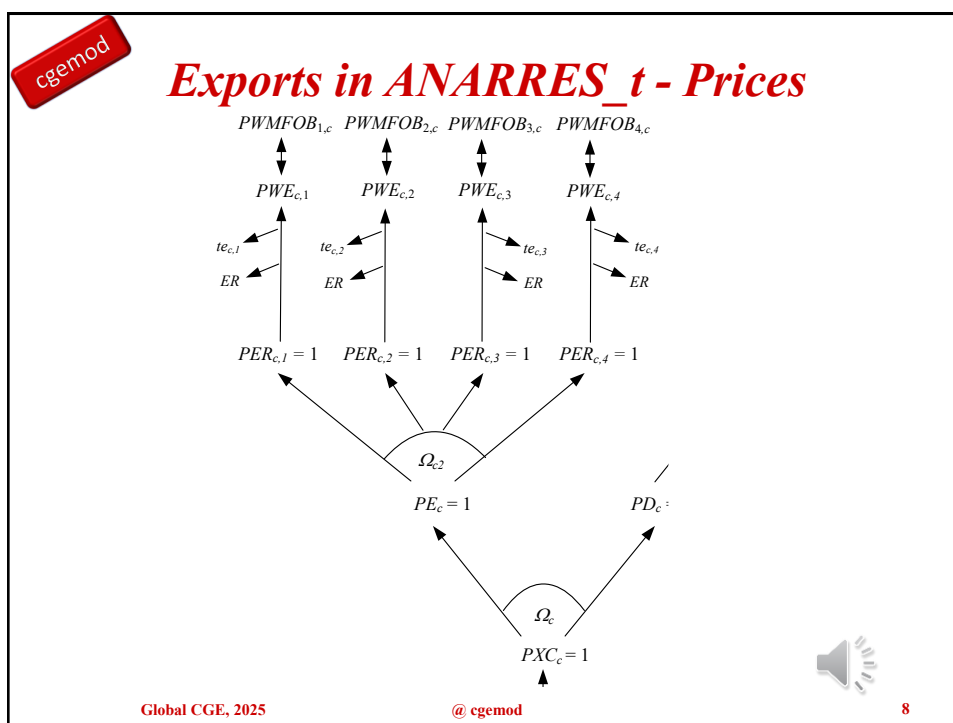


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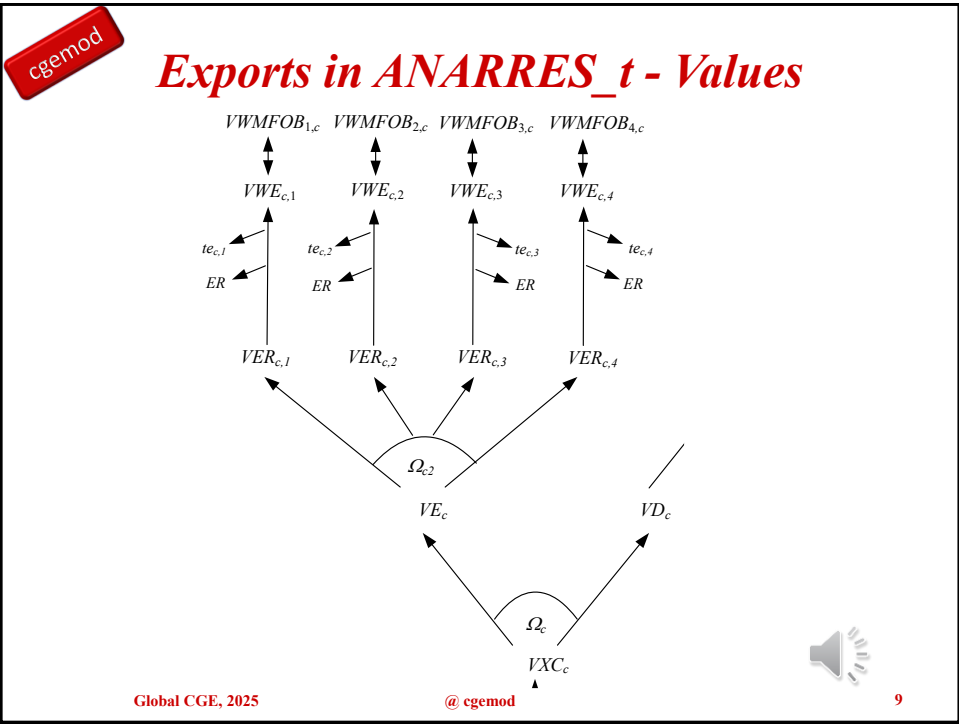
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Exports fob – OECD to Africa

$VWMFOB_{1,c}$

$VWE_{c,1}$

$te_{c,1}$

ER

$VER_{c,1}$

$PWMFOB_{1,c}$

$PWE_{c,1}$

$te_{c,1}$

ER

$PER_{c,1} = 1$

	cagr	cnres	cmanu	cserv	wafr	woecd	wrow	wglo
cagr	0	0	0	0	8,489	95,710	59,225	0
cnres	0	0	0	0	2,089	194,642	55,515	0
cmanu	0	0	0	0	160,336	3,878,998	2,031,215	0
cserv	0	0	0	0	49,102	1,111,965	494,544	307,616
tafr	-8	-3	-297	0	0	0	0	0
teocd	-15	-199	974	0	0	0	0	0
terow	-42	-39	820	0	0	0	0	0

$PER_{c,w,r} * QER_{c,w,r} = SAMG(c,w,r) - SAMG(ter,c,r)$

$= (PWE_{c,w,r} * QER_{c,w,r}) - (ter_{c,w,r} * PWE_{c,w,r} * QER_{c,w,r})$

$PER_{c,w,r} = PWE_{c,w,r} * (1 - ter_{c,w,r}) * ER_r$

$ter_{c,w,r} = \frac{SAMG(ter,c,r)}{SAMG(c,w,r)} = \frac{-7.6}{8,488.9} = -0.00089843$

$ER_r = 1.00$

$PER_{c,w,r} = 1.00$

$PWE_{cagr,wafr,woecd} = \frac{1}{(1 - (-0.00089843))} = 0.999102323 = PWMFOB_{woecd,cagr,af}$

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$PWMFOB_{1,c}$

$VWE_{c,1}$

$te_{c,1}$

ER

$VER_{c,1} = 1$

$PWE_{c,1}$

$PWMFOB_{1,c}$

$te_{c,1}$

ER

$PER_{c,1} = 1$

Exports fob – OECD to Africa

	cagr	cnres	cmanu	cserv	wafr	woecd	wrow	wglo
cagr	0	0	0	0	8,489	95,710	59,225	0
cnres	0	0	0	0	2,089	194,642	55,515	0
cmanu	0	0	0	0	160,336	3,878,998	2,031,215	0
cserv	0	0	0	0	49,102	1,111,965	494,544	307,616
teafr	-8	-3	-297	0	0	0	0	0
teoecd	-15	-199	974	0	0	0	0	0
terow	-42	-39	820	0	0	0	0	0

8,488.9

8,488.9

-7.6

1

8,496.4

$QER0(c,w,r) \$cer(c,w,r)$
 $= (SAMG(c,w,r) - SUM(ter$map_w_ter(w,ter), SAMG(ter,c,r))) / PER0(c,w,r) ;$

$PWE0(c,w,r) \$QER0(c,w,r)$
 $= (SAMG(c,w,r) / ER0(r)) / QER0(c,w,r) ;$

$te0(c,w,r) \$cer(c,w,r)$
 $= SUM(ter$map_w_ter(w,ter), SAMG(ter,c,r)) / SAMG(c,w,r) ;$

$PWMFOB0(w,c,r) = SUM((rp,wp)$
 $\$ (map_w_r(w,rp)$
 $\$map_r_w(r,wp)), PWE0(c,wp,rp)) ;$

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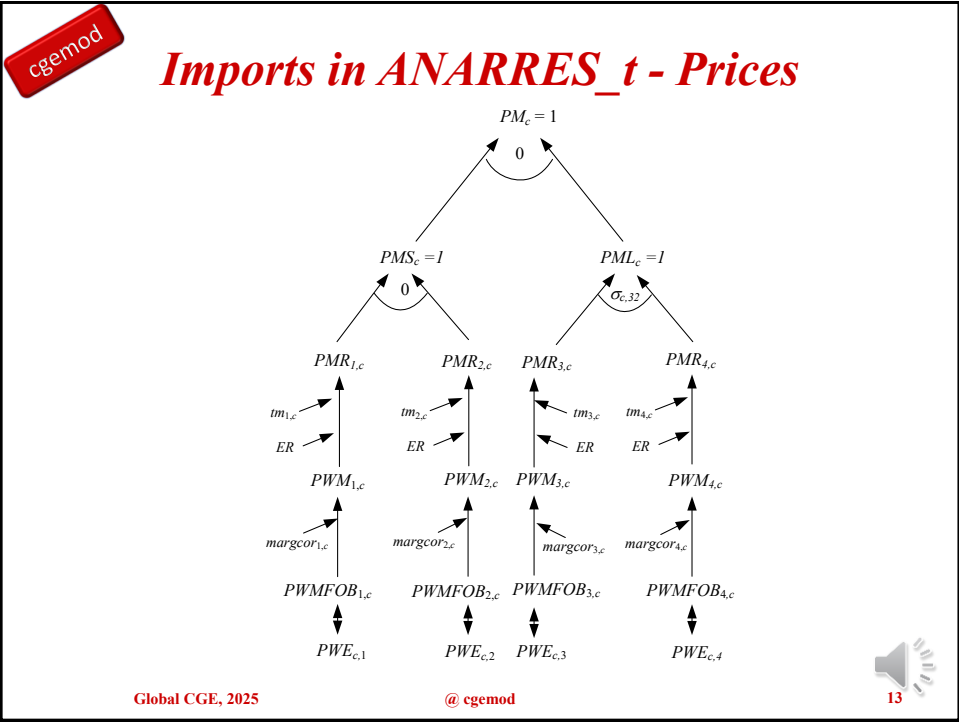
Trade Prices - Imports

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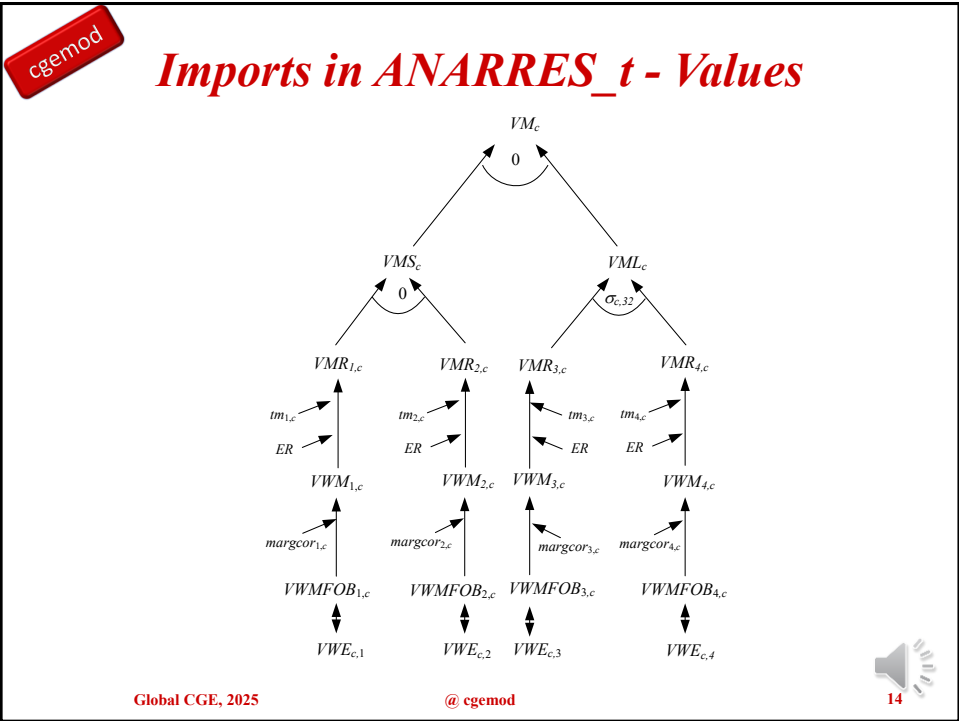
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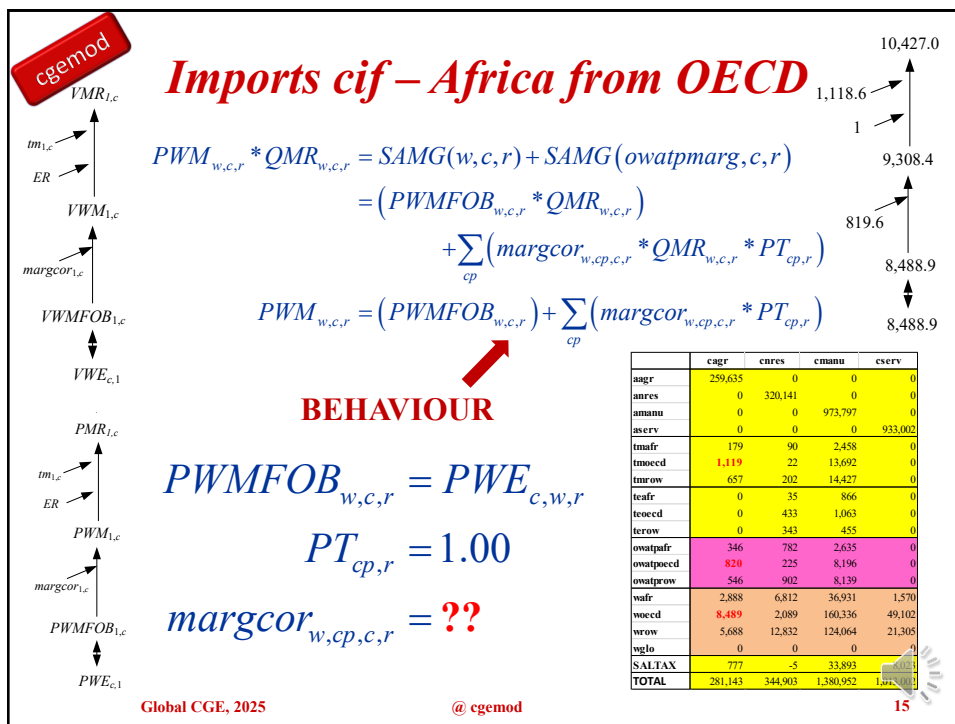
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What is margcor?

What is margcor?

Trade and transport margins associated with moving a unit of a commodity from a source to a destination region

Why does it have 4 indices?

- w = source region
- cp = type of trade and transport service
- c = the commodity traded
- r = destination region

How many types of trade & transport margin?

- otp - transport nec
- wtp - sea transport
- atp - air transport

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What is margcor?

margin set – ct2(c)

tuple with THREE arguments

IMPMARG(w,ct2,c,r)
= SUM(owatpmarg\$map_c_w_marg(ct2,w,owatpmarg),
SAMG(owatpmarg,c,r)) ;

margcor(w,c,cp,r)\$QMR0(w,cp,r)
= IMPMARG(w,c,cp,r)/PT0(c,r)/QMR0(w,cp,r) ;

quantities of margin services

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Imports cif – Africa from OECD

$$\text{margcor}_{woecd,cserv,cagric, afr} = \frac{\text{SAMG}(\text{owatpoecd}, \text{cagric}, \text{afr}) / \text{PT}_{cserv, afr}}{\text{SAMG}(\text{woecd}, \text{cagric}, \text{afr}) / \text{PWMFOB}_{woecd, cagric, afr}}$$
$$= \frac{Q^T_{woecd, cserv, cagric, afr}}{QMR_{woecd, cagric, afr}}$$
$$= \frac{819.6}{1} \cdot \frac{1}{\frac{8,488.9}{0.99910}} = \frac{819.6}{8,496.5} = 0.0964592056$$

BEHAVIOUR

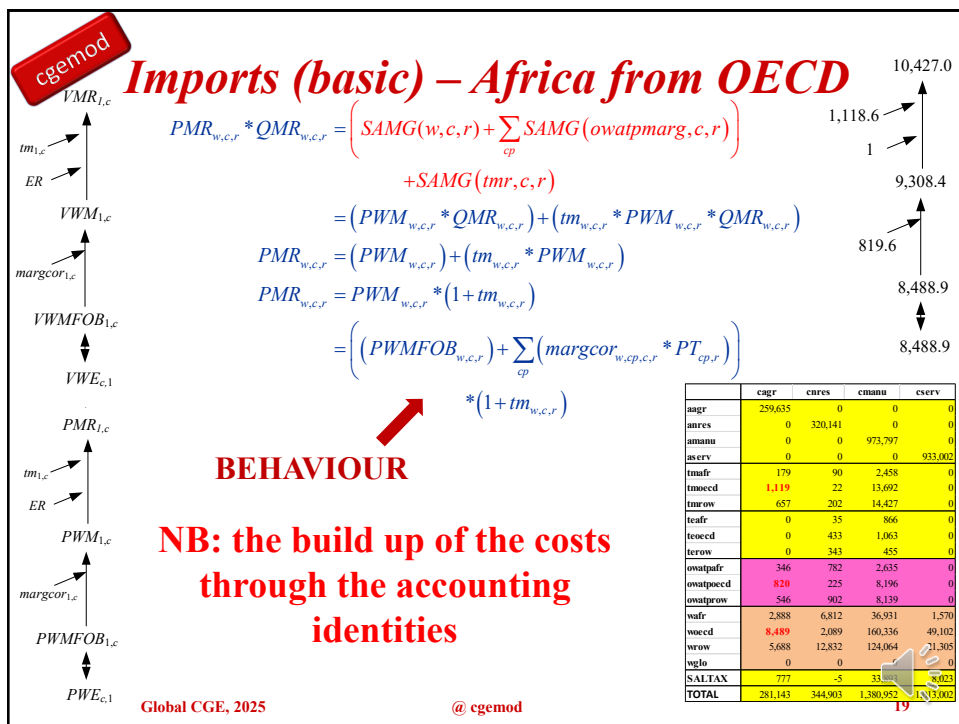
$$\text{PWM}_{w,c,r} = (\text{PWMFOB}_{w,c,r}) + \sum_{cp} (\text{margcor}_{w, cp, c, r} * \text{PT}_{cp, r})$$
$$= 0.9991023 + (0.09645920356 * 1)$$
$$= 1.09556153$$

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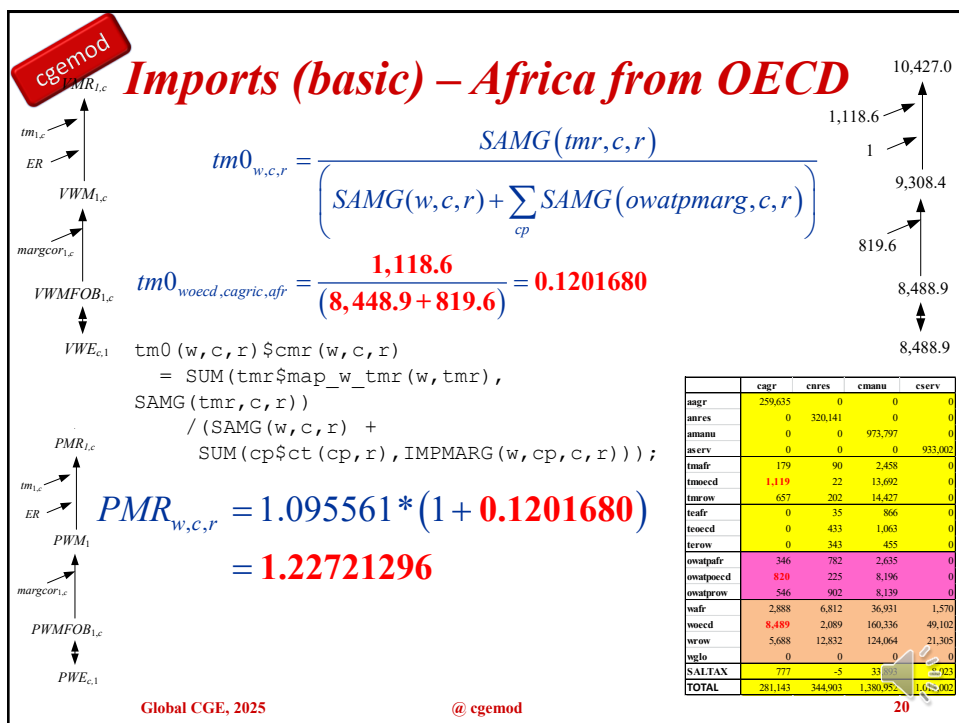
	cagr	cnres	cnanu	cserv
aggr	259,635	0	0	0
anres	0	320,141	0	0
amanu	0	0	973,797	0
aserv	0	0	0	933,002
tmufr	179	90	2,458	0
tmoeed	1,119	22	13,692	0
tmrow	657	202	14,427	0
tcufr	0	35	866	0
tcoecd	0	433	1,063	0
tcrw	0	343	455	0
owatpufr	346	782	2,635	0
owatpoecd	820	225	8,196	0
owatprow	546	902	8,139	0
vufr	2,888	6,812	36,931	1,570
woecd	8,489	2,089	160,336	49,102
wrow	5,688	12,832	170,064	21,305
uglo	0	0	0	0
SALTAX	777	3,893	8,021	0
TOTAL	281,143	344,903	539,952	1,013,002

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Aggregate Import Quantities

$PM_c = 1$

0

$PMS_c = 1$

0

$PML_c = 1$

$\sigma_{c,32}$

$PMR_{1,c}$

$PMR_{2,c}$

$PMR_{3,c}$

$PMR_{4,c}$

In general

$PMR_{w,c,r} \neq 1.000$

But

$PM_{c,r} = 1.000$
 $PMS_{c,r} = 1.000$
 $PML_{c,r} = 1.000$

How is this apparent anomaly bridged?

$Q_{M0}(c,r) \$ P_{M0}(c,r)$
 $= \text{SUM}[w, PMR_0(w,c,r) * Q_{MR0}(w,c,r)] / PM_0(c,r) ;$

$Q_{M0}(c,r) \$ P_{M0}(c,r)$
 $= [(PMS_0(c,r) * Q_{MS0}(c,r)) + (PML_0(c,r) * Q_{ML0}(c,r))] / PM_0(c,r) ;$

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Globe Region Prices

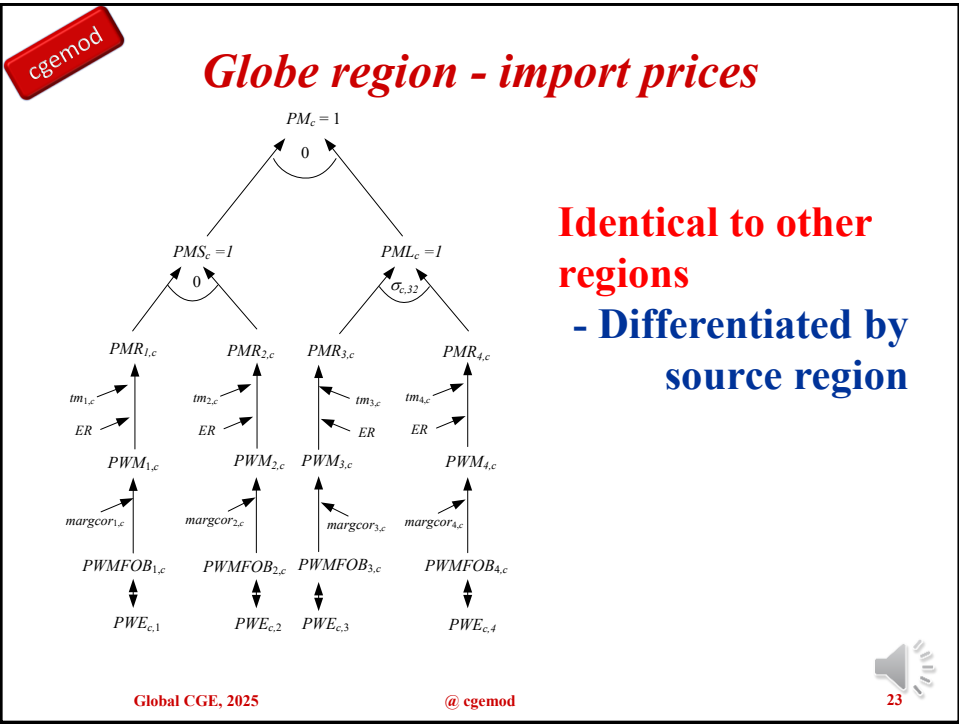
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Globe region – margin prices & clearing

regions without ‘globe’

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* ## Margin Trade Accounts

GLOBEQUIL(c,r)$ (ct2(c) AND rgn(r))..
    SUM(w, QT(w,c,r))
    =E= SUM(wp$map_w_r(wp,r),QER(c,wp,"glo")) ;

PTDEF(c,r)$ (ct2(c) AND rgn(r))..
    PT(c,r) =E= SUM(wp$map_w_r(wp,r),PWE(c,wp,"glo")) ;
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Understanding

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Understanding

Do it for yourself

1. Put the SAMGs into Excel
2. Build up the price linkages in Excel
 - a) Start with exports $\Rightarrow PWE/PWMFOB$
 - b) Then build up imports
 - c) Calculate quantities
 - d) Identify how the price normalisation in region r works
3. Check your results against the anar_t.gdx file
4. If wrong look at the anar_t_parmcalib.inc file

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ANARRES

Trade Price Definitions in ANARRES_t

The End

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