



Trade Relationships in the ANARRES_t Model

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Outline

- Armington ‘insight’
- Functional Form Issues
 - Shares in CE functions
 - CET functions
- ANARRES **model** trade
 - Imports
 - Exports
- Globe **region** trade
 - Imports
 - Exports

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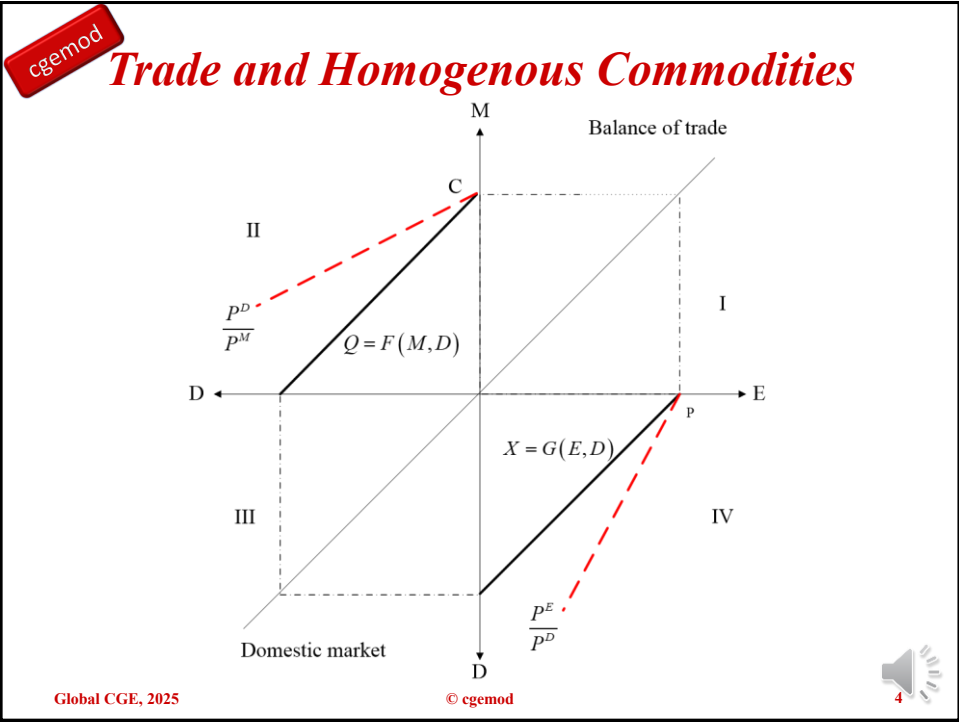
Armington ‘Insight’

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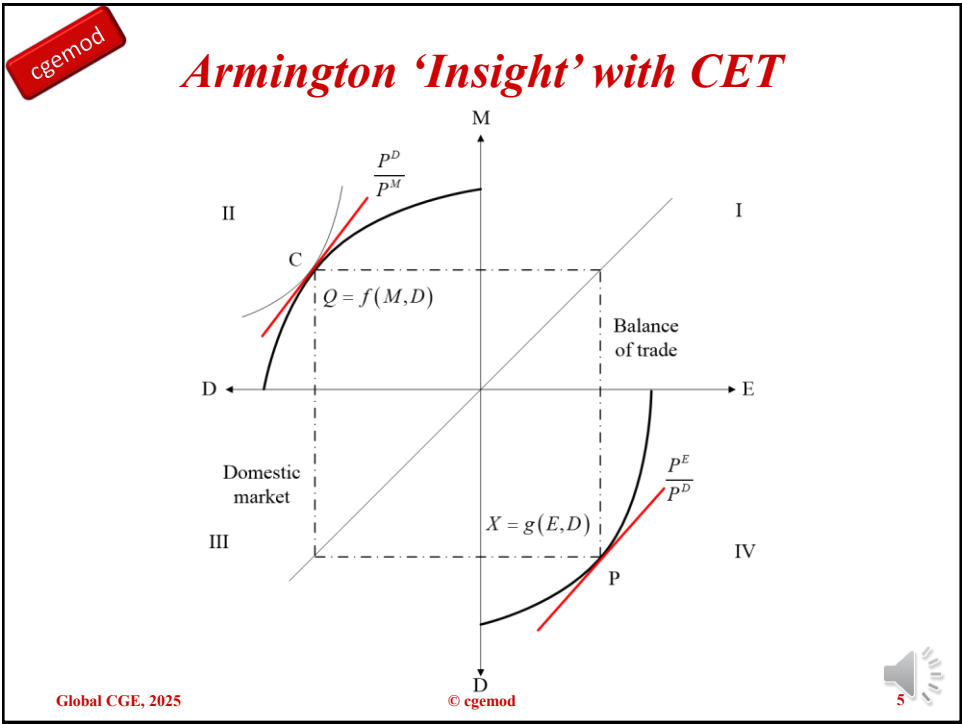
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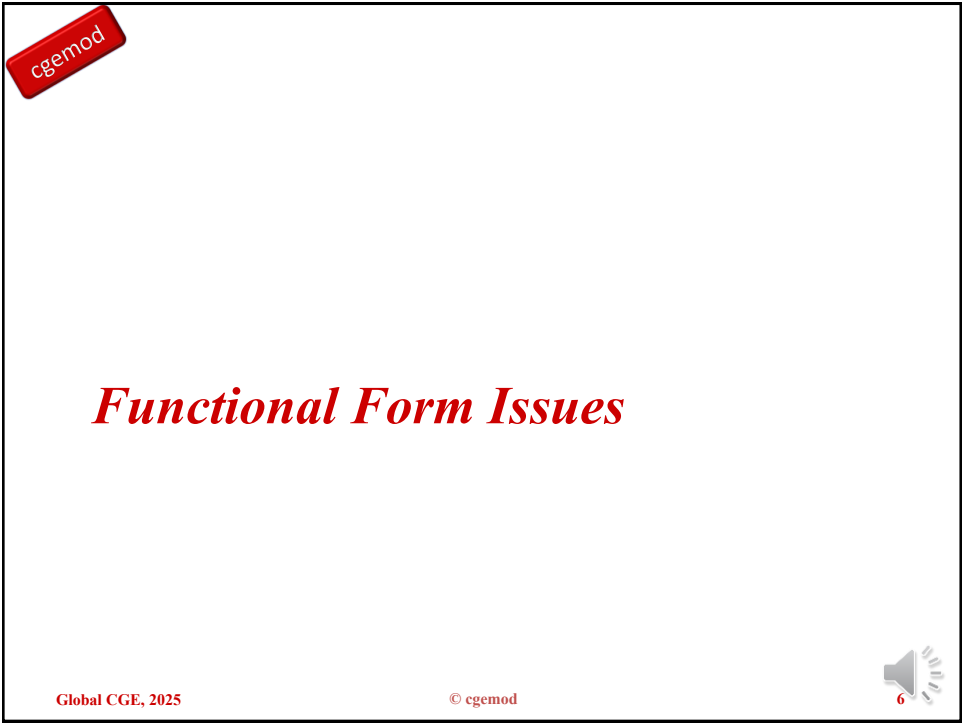
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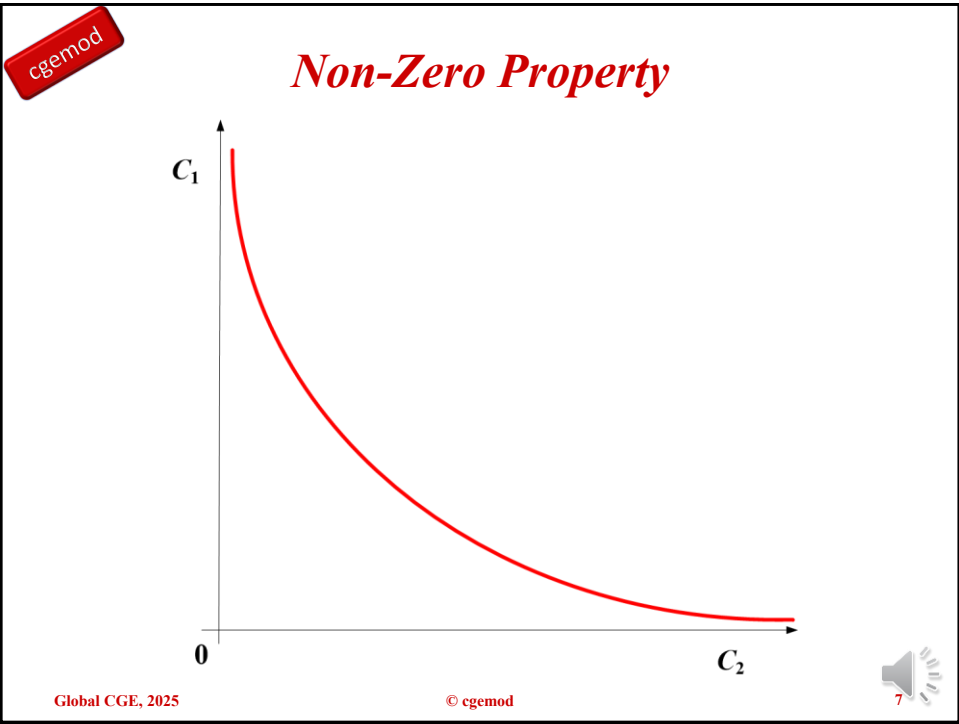


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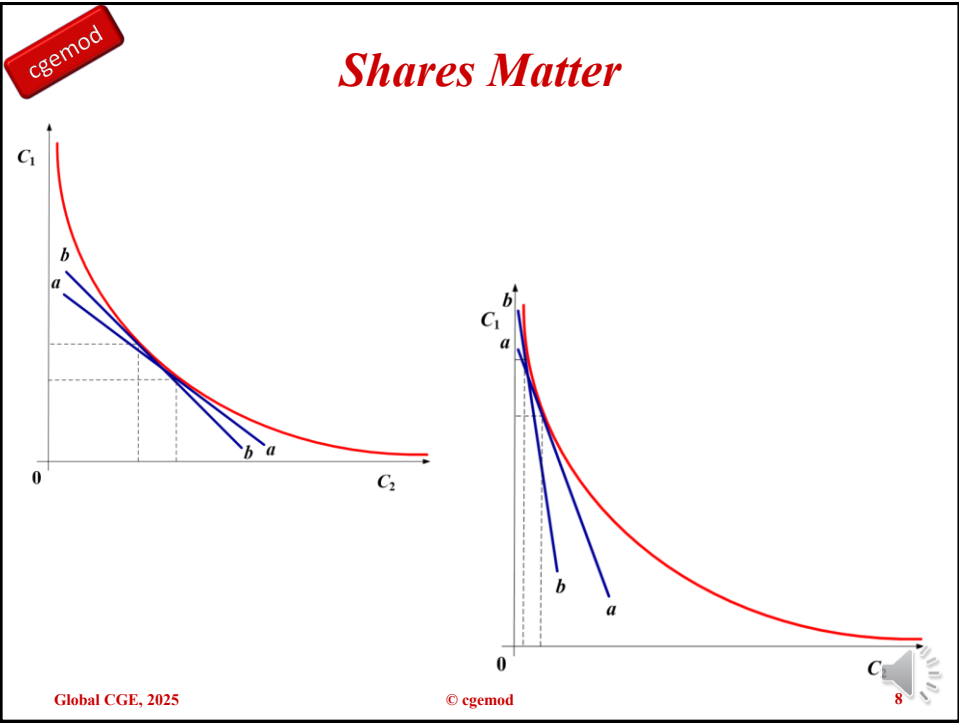


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Use of CET Functions

- **Use of CET functions violates LOOP**
 - ONE mechanism for determining **MORE** than one price
 - **MORE** than one ‘apparent’ price in **ONE** row
- **When is it appropriate to violate LOOP?**
 - Pragmatism
 - Theory
 - Commodities
 - Factors
- **Use of CET for Exports**
 - Allows domestic producers to respond to price changes
 - Mitigates the potential for large terms of trade effects
- **BUT**
 - What are the units?
 - How big are the changes?


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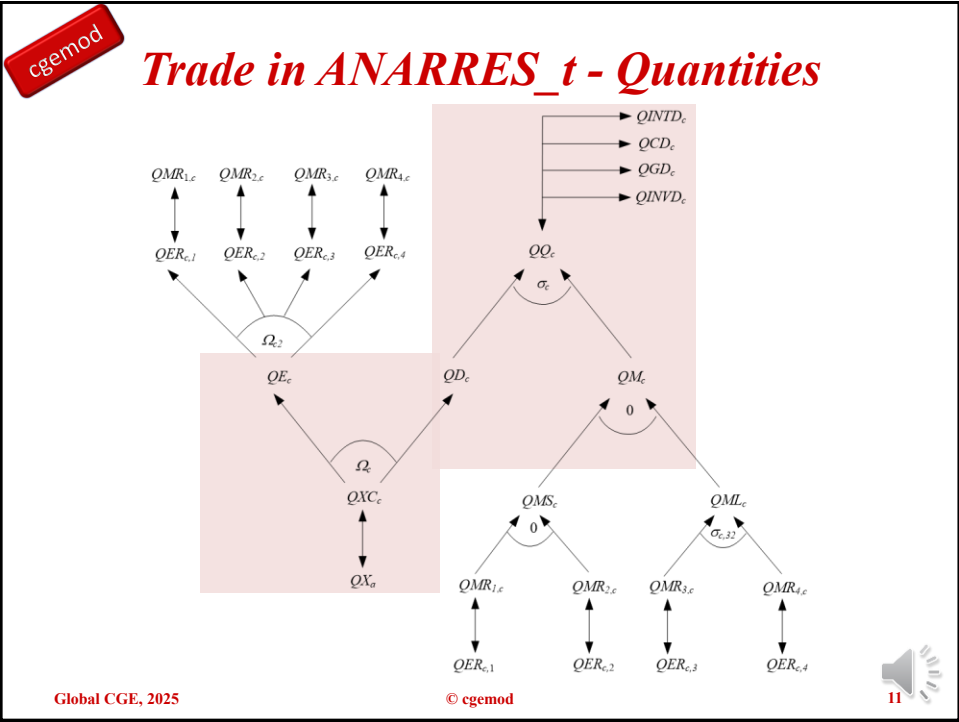


ANARRES_t model trade

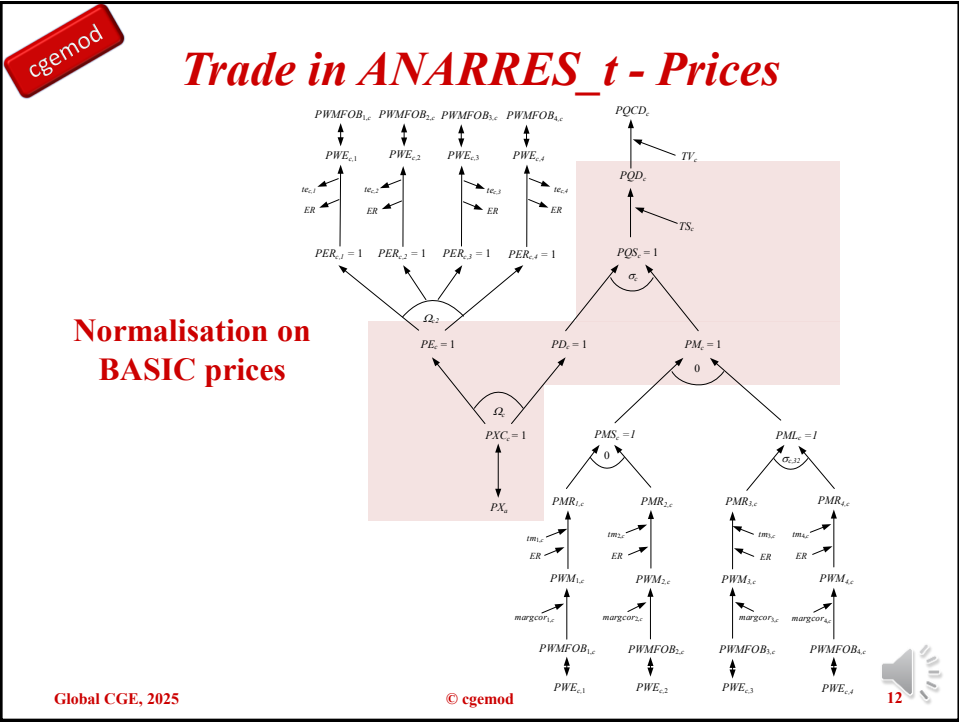
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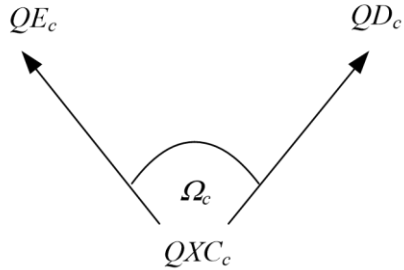
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Exports in ANARRES_t - Quantities

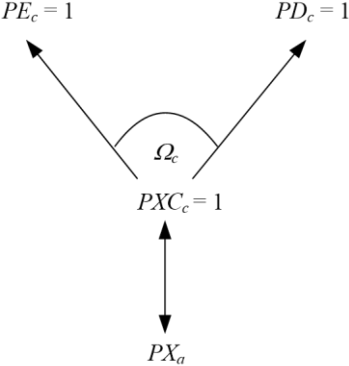
- Aggregate exports (QE) and domestic (QD) imperfect substitutes
 - Ω_c the elasticity of transformation
 - 1st order condition by prices (PE and PD)
- Composite commodity (QXC) produced by domestic producers



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Exports in ANARRES_t - Prices



- The price of the composite commodity (PXC) produced by domestic producers is a CET aggregate
- Aggregate export prices (PE) and domestic prices (PD) are imperfect substitutes
 - Ω_c the elasticity of transformation
- Normalised on BASIC prices

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Exports in ANARRES_t - Quantities

- Aggregate exports (QE) are CET aggregates of exports to different regions (QMR)
- By definition markets clear when exports from region s (source) to region d (destination) are equal to imports by region d (destination) from region s (source)

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Exports in ANARRES_t - Prices

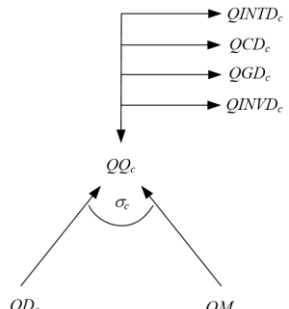
- Aggregate export prices (PE) are CET aggregates of the (basic) prices of exports to different regions (PER)
- The *fob* prices of exports (PWE) are
 - converted to foreign currency units via the exchange rate (ER)
 - net** of any export taxes (te), i.e., export taxes are paid by domestic producer
- By definition the *fob* export price (PWE) must equal the *fob* import price ($PWMFOB$) in equilibrium

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Imports in ANARRES_t - Quantities



- Aggregate imports (QM) and domestic (QD) imperfect substitutes
 - σ_c the elasticity of substitution
 - 1st order condition by prices (PM and PD)
- Composite commodity (QQ) sold to domestic consumers

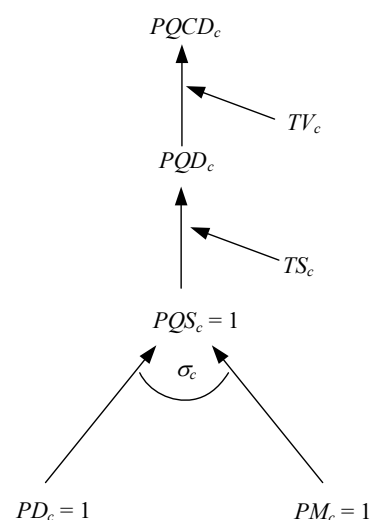
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Imports in ANARRES_t - Prices



- The price of the composite commodity (PQS) consumed by domestic consumer is a CES aggregate
- Aggregate import prices (PM) and domestic prices (PD) are imperfect substitutes
 - σ_c the elasticity of transformation
- VAT (TV) only paid on household consumption

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Imports in ANARRES_t - Quantities

- Aggregate imports (QM) a Leontief composite of two types of imports
 - ‘small’ shares (QMS)
 - ‘large’ shares (QML)
- Shares are defined as the volume shares of imports of c by r (from w)
- QML is a CES aggregate of imports from sources with ‘large’ shares
- QMS is a Leontief aggregate of imports from sources with ‘small’ shares
- The definition of ‘small’ is set when calibrating the model

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Imports in ANARRES_t – Prices 1

- By definition the *fob* import prices ($PWMFOB$) must equal the *fob* export prices (PWE) in equilibrium
- cif* import prices (PWM) are inclusive of margins (*margcor*)
- The *basic* prices of imports (PMR) are
 - in domestic currency units via the exchange rate (ER)
 - Net of any import taxes (tm), i.e., import taxes paid by domestic consumer

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Imports in ANARRES_t – Prices 2

$PME = 1$

0

$PMS_c = 1$

0

$PML_c = 1$

$\sigma_{c,32}$

$PMR_{1,c}$

$im_{1,c}$

ER

$PMR_{2,c}$

$im_{2,c}$

ER

$PMR_{3,c}$

$im_{3,c}$

ER

$PMR_{4,c}$

$im_{4,c}$

ER

$PWM_{1,c}$

$margcor_{1,c}$

$PWM_{2,c}$

$margcor_{2,c}$

$PWM_{3,c}$

$margcor_{3,c}$

$PWM_{4,c}$

$margcor_{4,c}$

$PWMFOB_{1,c}$

$PWE_{c,1}$

$PWMFOB_{2,c}$

$PWE_{c,2}$

$PWMFOB_{3,c}$

$PWE_{c,3}$

$PWMFOB_{4,c}$

$PWE_{c,4}$

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- Aggregate ‘large’ import prices (PML) are CES aggregates of the (basic) prices of imports from different regions (PMR)
- Aggregate ‘small’ import prices (PMS) are Leontief aggregates of the (basic) prices of imports from different regions (PMR)
- Aggregate import prices (PM) are Leontief composites of the prices of two types of imports
 - ‘small’ shares (PMS)
 - ‘large’ shares (PML)

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Globe region trade

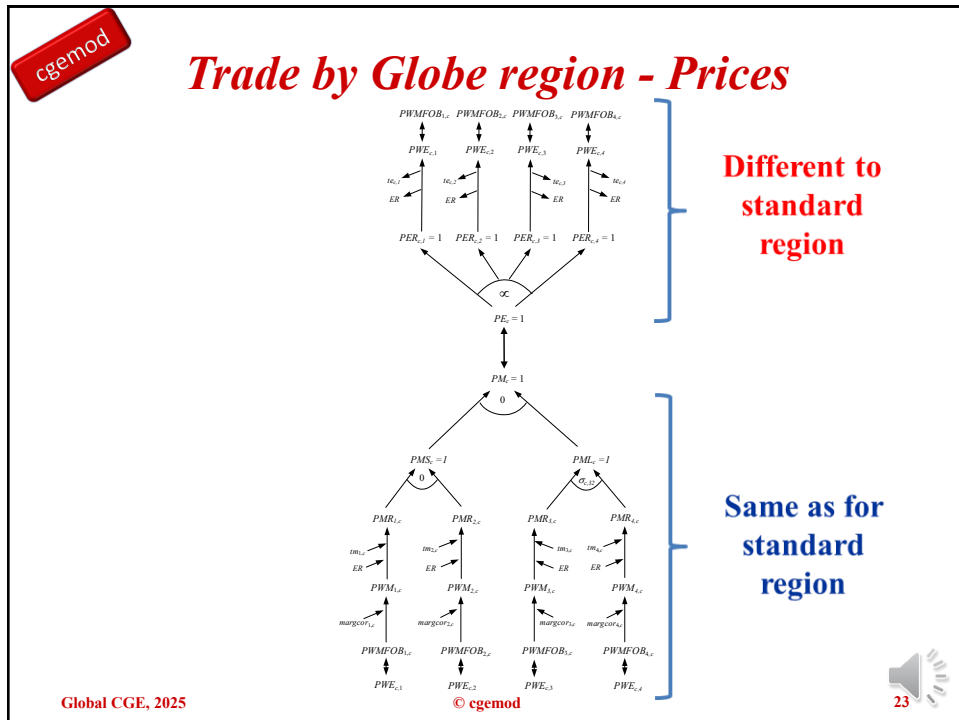
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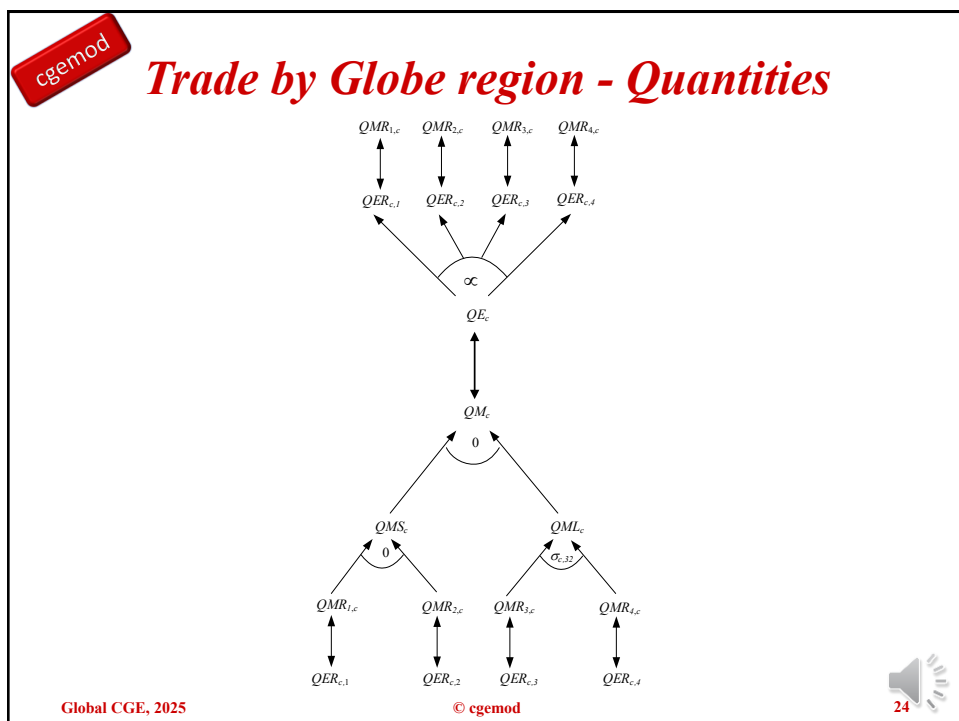
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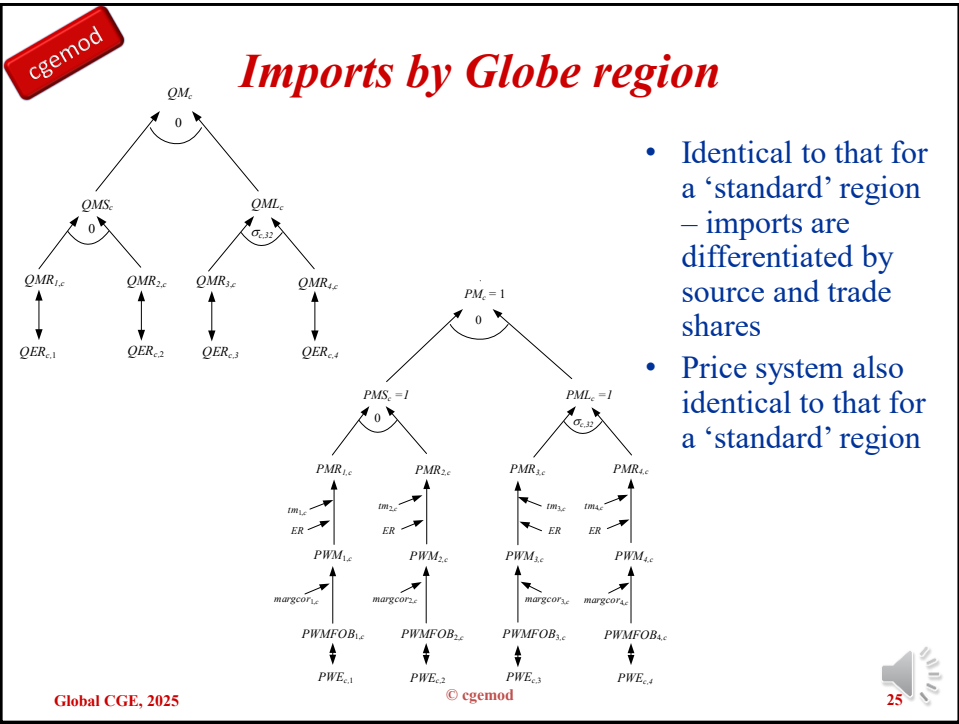
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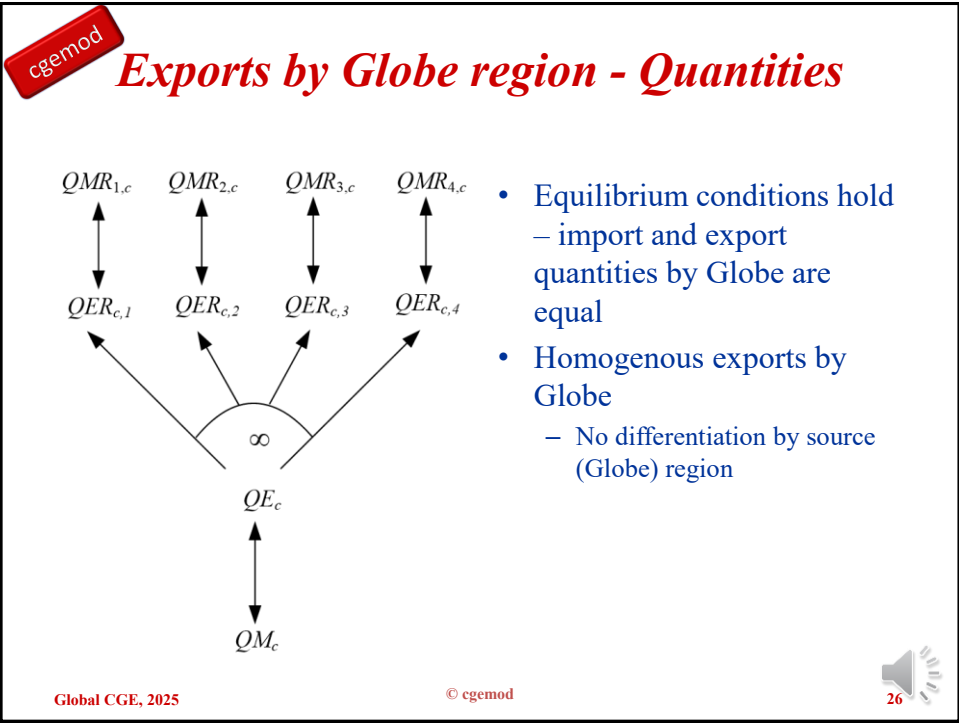
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Exports by Globe region - Prices

$PWMFOB_{1,c}$

$PWE_{c,1}$

$te_{c,1}$

ER

$PER_{c,1}$

$PWMFOB_{2,c}$

$PWE_{c,2}$

$te_{c,2}$

ER

$PER_{c,2}$

$PWMFOB_{3,c}$

$PWE_{c,3}$

$te_{c,3}$

ER

$PER_{c,3}$

$PWMFOB_{4,c}$

$PWE_{c,4}$

$te_{c,4}$

ER

$PER_{c,4}$

∞

$PE_c = 1$

- Same equilibrium conditions for prices hold as for 'standard' region
- Homogenous exports by Globe
 - Therefore $PE = PER \forall c$

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ANARRES

Trade Relationships in the

ANARRES_t Model

The End

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