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STAGE

STAGE_t: Price & Accounting Identities: Part 1

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Outline

- Social Accounting Matrix
- Commodities
  - Value System
  - Accounting Identities & Prices
    - Domestic Demand
    - Imports & Exports
- *Activities*
  - *Value System*
  - *Accounting Identities & Prices*
- *Factors*
- *Institutions*
  - *Household*
  - *Government*
  - *Savings & Investment*
  - *Rest of World*

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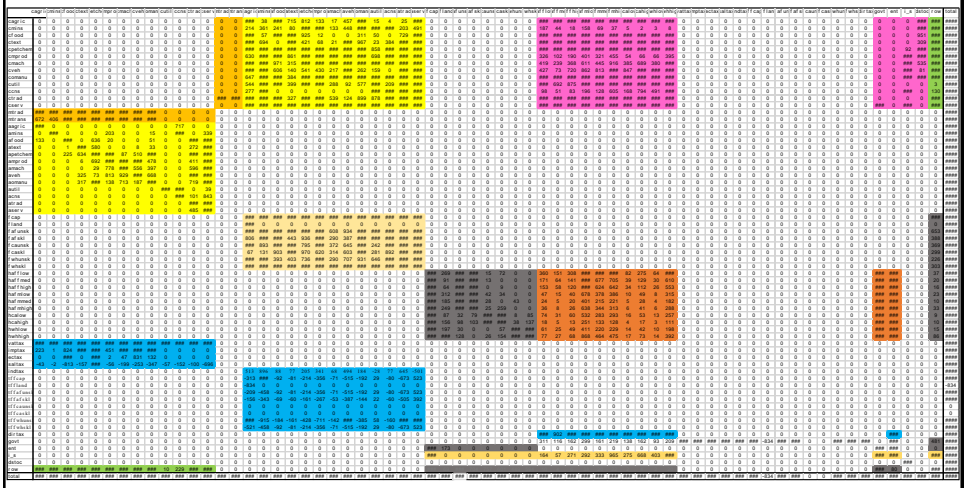
Social Accounting Matrix



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Commodity Accounts

Accounting Identities & Prices

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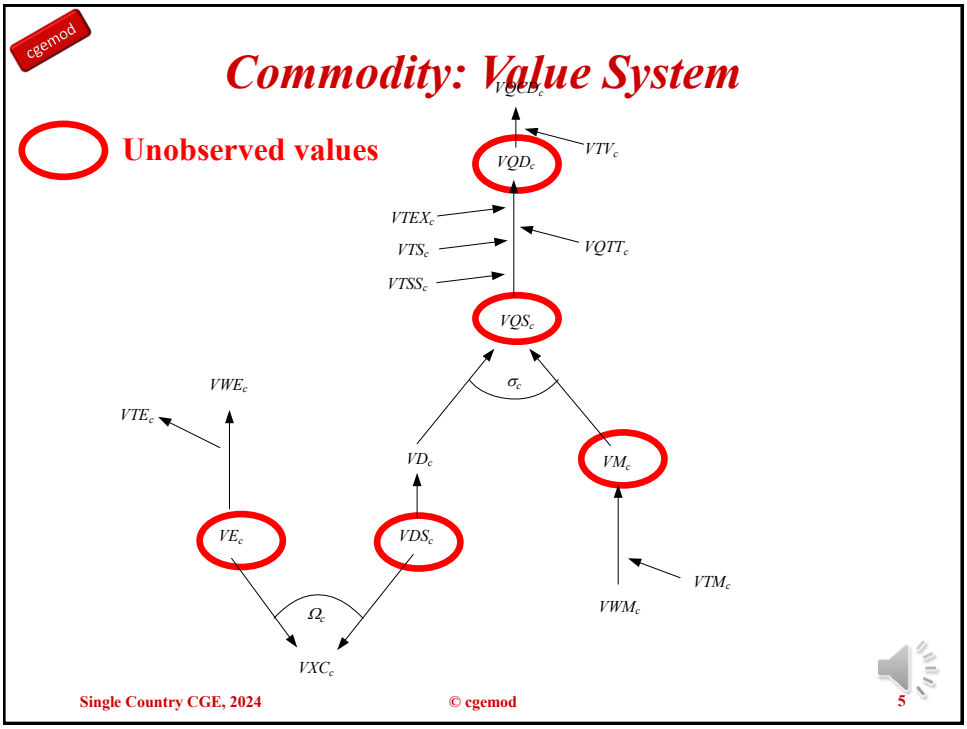
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Commodity: Value System
Unobserved values
$VQCD_c$
VQD_c
VTV_c
$VTEX_c$
VTS_c
$VTSS_c$
$VQTT_c$
VQS_c
σ_c
VWE_c
VTE_c
VD_c
VM_c
VE_c
VDS_c
VTM_c
VWM_c
Ω_c
VXC_c
Single Country CGE, 2024
© cgemod
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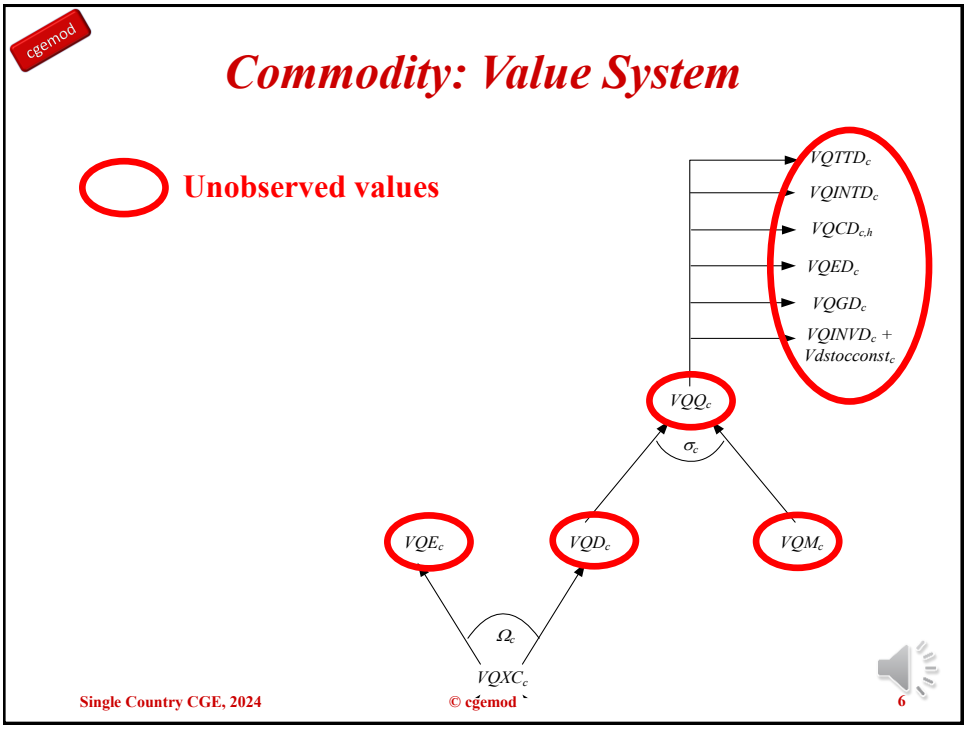
cgemod
Commodity: Value System
Unobserved values
$VQTTD_c$
$VQINTD_c$
$VQCD_{c,h}$
$VQED_c$
$VQGD_c$
$VQINVD_c$ +
$Vdstocconst_c$
VQQ_c
σ_c
VQE_c
VQD_c
VQM_c
Ω_c
$VQXC_c$
Single Country CGE, 2024
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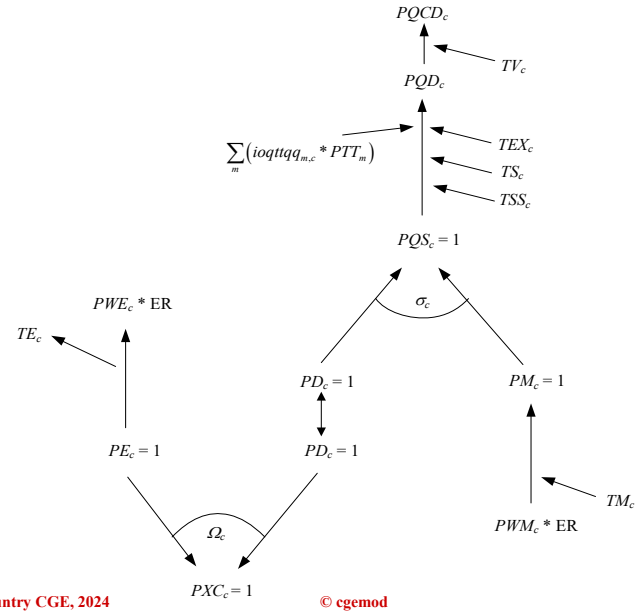
Commodity: Price System



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Domestic Trade & Transport Margins

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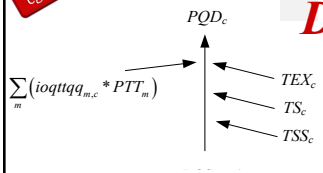
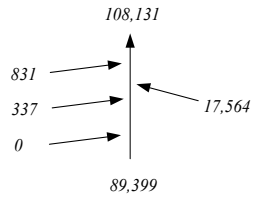
Domestic Margins





$$QTT_{'mtrad'} = \sum_c \frac{SAM_{c,'mtrad'}}{PQD_c}$$

$$PTT_{'mtrad'} = \sum_c \left[\left(SAM_{c,'mtrad'} / PQD_c / QTT_{'mtrad'} \right) * PQD_c \right]$$

$$ioqttqq_{'cveh','mtrad'} = \frac{\left(SAM_{'mtrad',c} \Big/ \left\{ \left[SAM_{c,'total'} - SAM_{c,'row'} - SAM_{'vattax',c} \right] / QQ_c \right\} \right)}{QQT_{'mtrad'}}$$

$$PQD_c = \left\{ \left[SAM_{c,'total'} - SAM_{c,'row'} - SAM_{'vattax',c} \right] / QQ_c \right\}$$

Behavioural assumption – io coefficient

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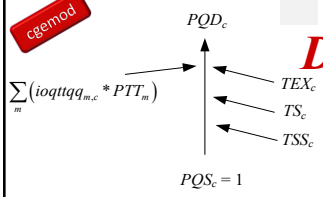
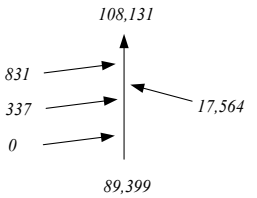
Domestic Margins





RSA	cveh	mtrad	mtrans	ACTIVITIES	HHOLD	govt	INVEST
cveh		0	0	68,149	24,154	0	21,133
ctrad		186,299	19,838	130,919	46,955	0	0
mtrad	16,011						
mtrans	1,553						
SUPPLY	73,372						
imptax	1,167						
saltax	337						
ssaltax	0						
vattax	5,306						
ectax	831						
row	31,815						

$$QTT_{'mtrad'} = \frac{186,299}{1.00346} = 185,656$$

$$PTT_{'mtrad'} = \left[\begin{array}{l} (186,299/1.00346/185,656) \\ *1.00346 \end{array} \right] = 1.00346$$

$$ioqttqq_{'cveh','mtrad'} = \frac{(16,011/\{1.00346\})}{185,656} = 0.178474$$

$$ioqttqq_{'cveh','mtran'} = 0.0173156$$

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Domestic Demand Prices

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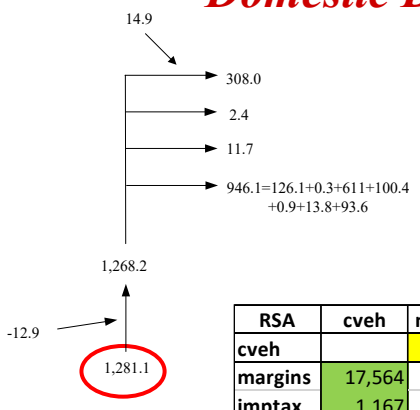
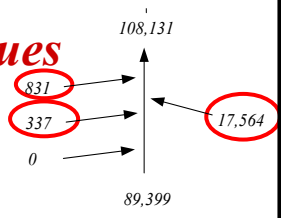
Domestic Demand: Values





RSA	cveh	margins	intermediate	household	govt	investment
cveh		0	68,149	24,154	0	21,133
margins	17,564					
imptax	1,167					
saltax	337					
ssaltax	0					
vattax	5,306					
ectax	831					
total	130,390					

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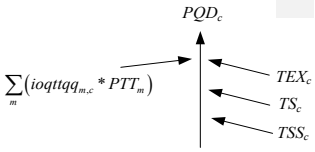
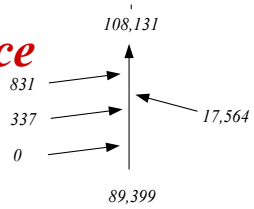
Domestic Demand: Price





$$\left(\begin{array}{l}\sum_m SAM_{'cveh',m} + \sum_a SAM_{'cveh',a} \\ +\sum_h SAM_{'cveh',h} + SAM_{'cveh','govt'} \\ \sum_i SAM_{'cveh',i} - SAM_{'vatax','cveh'}\end{array}\right) = \left(\begin{array}{l}\left(PQS_{'cveh'} * QQ_{'cveh'}\right) + \sum_m SAM_{m,'cveh'} \\ +SAM_{'saltax','cveh'} + SAM_{'ssaltax','cveh'} \\ +SAM_{'ectax','cveh'}\end{array}\right)$$

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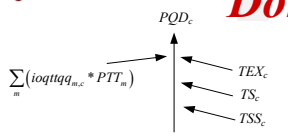
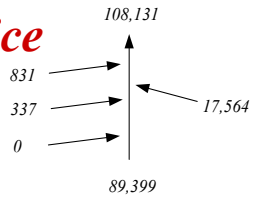
Domestic Demand: Price





$$\left(PQD_{'cveh'} * QQ_{'cveh'}\right) = \left(PQS_{'cveh'} * QQ_{'cveh'}\right) + \sum_m \left(ioqttqq_{'cveh',m} * PTT_m * QQ_c\right)$$

Behavioural assumption – *ad valorem*

$$+\left(TS_{'cveh'} * PQS_{'cveh'} * QQ_{'cveh'}\right)$$
$$+\left(TSS_{'cveh'} * PQS_{'cveh'} * QQ_{'cveh'}\right)$$
$$+\left(TEX_{'cveh'} * QQ_{'cveh'}\right)$$

Behavioural assumption – *specific*

$$PQD_{'cagric'} = \left[PQS_{'cagric'} + \left(TS_{'cagric'} * PQS_{'cagric'}\right) + \left(TSS_{'cveh'} * PQS_{'cveh'}\right)\right] + \left(TEX_{'cveh'}\right) + \sum_m ioqttqq_{'cveh',m} * PTT_m$$

$$PQD_{'cagric'} = PQS_{'cagric'} * \left(1 + TS_{'cagric'} + TSS_{'cveh'}\right) + tex_{'cveh'} + \sum_m ioqttqq_{'cveh',m} * PTT_m$$

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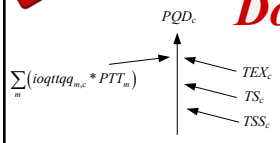
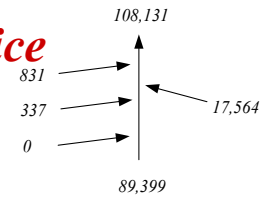
Domestic Demand: Price





$$(PQD_{,cveh'} * QQ_{,cveh'}) = (PQS_{,cveh'} * QQ_{,cveh'}) + \sum_m (ioqttqq_{,cveh',m} * PTT_m * QQ_c)$$
$$+ (TS_{,cveh'} * PQS_{,cveh'} * QQ_{,cveh'})$$
$$+ (TSS_{,cveh'} * PQS_{,cveh'} * QQ_{,cveh'}) + (TEX_{,cveh'} * QQ_{,cveh'})$$

$$PQD_{,cveh'} = PQS_{,cveh'} * (1 + TS_{,cagric'} + TSS_{,cveh'}) + TEX_{,cveh'} + \sum_m (ioqttqq_{,cveh',m} * PTT_m)$$

$$TS_{,cveh'} = \frac{VTS_{,cveh'}}{VQS_{,cveh'}} = \frac{337}{89.4} = 0.00376603$$

$$TEX_{,cveh'} = \frac{VTEX_{,cveh'}}{VQS_{,cveh'}} = \frac{831}{89.4} = 0.00929355$$

$$TSS_{,cveh'} = \frac{VTSS_{,cveh'}}{VQS_{,cveh'}} = \frac{0}{89.4} = 0.0$$

$$\sum_m ioqttqq_{,cveh',m} * PTT_m = 0.1964669$$

$$PQD_{,cveh'} = 1.20952653$$

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Value Added Taxes

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Value Added Tax

- VAT
  - Tax on commodities in final demand
    - NOT a tax on value added
  - 'Rebated' on
    - Intermediate inputs
    - Investment
  - Not charged
    - Government
- Excise tax – specific per unit tax
- Saltax encompasses
  - GST
  - Other indirect taxes
  - ……
- Saltax NOT a 'clean' tax instrument

Decision: levy VAT - *ad valorem* over and above 'other' commodity taxes

An approximation

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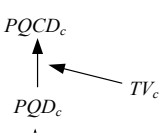
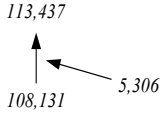
Value Added Tax





$$\left(PQCD_{'cveh'} * QCD_{'cveh',h}\right) = \left(\left[PQS_{'cveh'} * \left(1 + TS_{'cagric'} + TSS_{'cveh'}\right) + TEX_{'cveh'} + \sum_m ioqttqq_{'cveh',m} * PTT_m\right] * QCD_{'cveh',h}\right)$$

$$+ \left(TV_{'cveh'} * \left[PQS_{'cveh'} * \left(1 + TS_{'cagric'} + TSS_{'cveh'}\right) + TEX_{'cveh'} + \sum_m ioqttqq_{'cveh',m} * PTT_m\right] * QCD_{'cveh',h}\right)$$

$$PQCD_{'cveh'} = \left(PQD_{'cveh'} * QCD_{'cveh',h}\right) + \left(TV_{'cveh'} * PQD_{'cveh'} * QCD_{'cveh',h}\right)$$

$$= PQD_{'cveh'} + \left(TV_{'cveh'} * PQD_{'cveh'}\right)$$

$$PQCD_{'cveh'} = PQD_{'cveh'} + \left(1 + TV_{'cveh'}\right)$$

Behavioural assumption – *ad valorem*

$$TV_{'cveh'} = \frac{VTV_{'cveh'}}{\sum_h SAM_{'cveh',h} - SAM_{'vattax','cveh'}} = \frac{5{,}306}{24{,}154 - 5{,}306} = 0.281486$$

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Trade Prices

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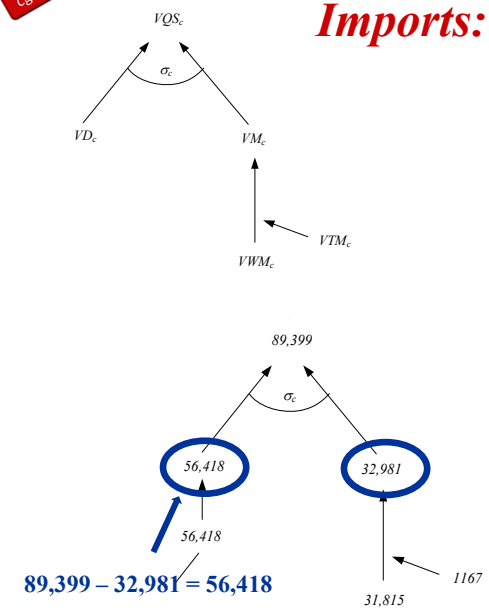
Imports: Values



RSA	cveh
mtrad	16,011
mtrans	1,553
aagric	0
amins	0
afood	0
atext	8
apetchem	510
amprod	1,385
amach	556
aveh	70,726
aomanu	187
autil	0
acns	0
atrad	0
aserv	0
imptax	1,167
saltax	337
ssaltax	0
vattax	5,306
ectax	831
row	31,815
total	130,390

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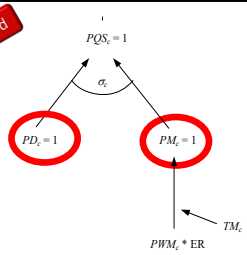
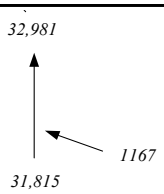


Imports: Prices



Behavioural assumption – *ad valorem*

$$(PM_{'cveh'} * QM_{'cveh'}) = (SAM_{'row','cveh'} + SAM_{'imptax','cveh'})$$

$$(PM_{'cveh'} * QM_{'cveh'}) = (PWM_{'cveh'} * QM_{'cveh'}) + (TM_{'cveh'} * PWM_{'cveh'} * QM_{'cveh'})$$

$$PM_{'cveh'} = PWM_{'cveh'} + (TM_{'cveh'} * PWM_{'cveh'})$$

$$PM_{'cveh'} = [PWM_{'cveh'} * (1 + TM_{'cveh'})]$$

$$TM_{'cveh'} = \frac{VTM_{'cveh'}}{VWM_{'cveh'}} = \frac{1,167}{31,815} = 0.0366677$$

$$PWM_{'cveh'} = \frac{PM_{'cveh'}}{(1 + tm_{'cveh'})} = 0.964629$$

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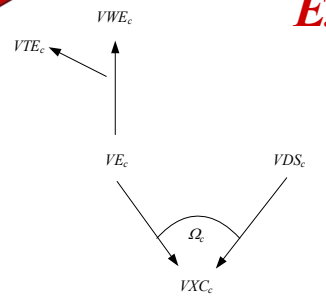
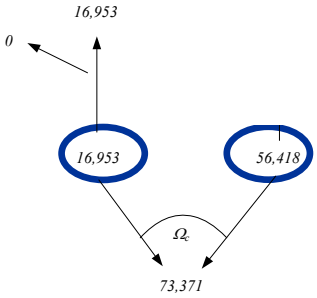


Exports: Values

RSA	cveh	row	total
cveh		16,953	130,390
exptax	0		8,311



73,371-16,953 = 56,418

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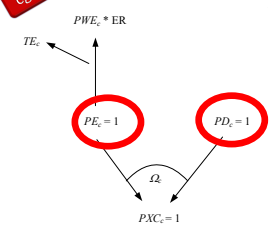
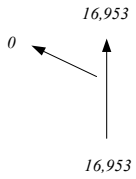
Exports: Prices





Behavioural assumption – *ad valorem*

$$(PE_{'cveh'} * QE_{'cveh'}) = (SAM_{'cveh','row'} - SAM_{'exptax','cveh'})$$

$$(PE_{'cveh'} * QE_{'cveh'}) = (PWE_{'cveh'} * QE_{'cveh'}) - (TE_{'cveh'} * PWE_{'cveh'} * QE_{'cveh'})$$

$$PE_{'cveh'} = PWE_{'cveh'} - (TE_{'cveh'} * PWE_{'cveh'})$$

$$PE_{'cveh'} = PWE_{'cveh'} * (1 - TE_{'cveh'})$$

$$TE_{'cveh'} = \frac{vVTE_{'cveh'}}{VWE_{'cveh'}} = \frac{0}{16,953} = 0.00$$

$$PWE_{'cveh'} = \frac{PE_{'cveh'}}{(1 - TE_{'cveh'})} = 1.00$$

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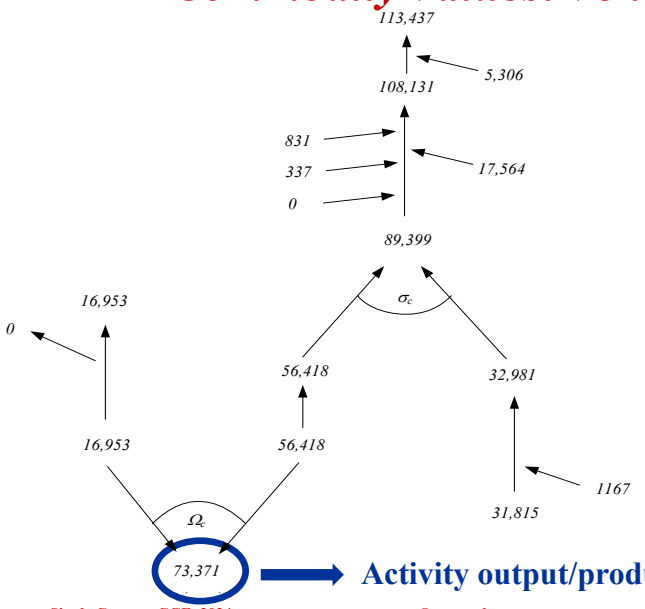
Commodity Values: Vehicles



Activity output/production

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Price and Accounting Identities: Part 1

The End

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